1994

Guidelines for the training of nautical surveyors in the I.R of Iran

Vahid Mobasheri

ANZK

WORLD MARITIME UNIVERSITY
Malmoe, Sweden

GUIDELINES FOR THE TRAINING OF NAUTICAL SURVEYORS IN THE I.R. OF IRAN

by

Vahid Mobasheri
I.R. of Iran

A dissertation submitted to the World Maritime University in partial fulfilment of the requirements for the award of the degree of

Master of Science

in

Maritime Safety Administration (Nautical)

IN THE NAME OF ALLAH,
THE MOST BENEFICENT,
THE MOST MERCIFUL,

ALLAH, it is who has subjected the sea to you that ships may sail thereon by his command and that you may seek of his bounty and that you may be grateful.

HOLY QORAN

DECLARATION

I certify that all material in this dissertation which is not my own work has been identified and that no material is included for which a degree has been previously conferred upon me.

The contents of this dissertation reflect my personal views and are not necessarily endorsed by the University.

Signature: V. Lobashov

Date: 10th Oct 1994

Supervised by:

Captain PAUL JEPPESEN
Lecturer,
Maritime Safety Administration Courses
World Maritime University

Assessed by:

Dr./Captain P.S.VANCHISWAR
Professor in Charge,
Maritime Safety Administration Courses
World Maritime University

Co-assessed by:

Captain PETER LAURIDSEN
Principal Surveyor,
The Danish Maritime Authority
Ex. Lecturer, World Maritime University

ACKNOWLEDGEMENTS

The author would like to express his profound gratitude to ***Professor P.S. Vanchiswar****, professor in charge of Maritime Safety Administration courses, for the continuous and precious guidance and support during study in the University and also during preparing this paper.*

Also grateful thanks to ***Capt. Paul Jeppesen****, Supervisor,* ***Capt. Peter Lauridsen****, Co-assessor,* ***Mr. Per Eriksson, Captain Sven-Åke Wernhult*** *and* ***Captain Jens Østerballe*** *who not only made valuable contribution to this paper, but also from whom the author, in one way or another acquired very useful knowledge and co-operation during the two years study in Malmö.*

He would also like to thanks the ***Maritime administrations in Sweden, Denmark, Finland, Norway, Germany*** *and* ***France*** *for their support and collaboration during the field training in those countries.*

Finally, the author is particularly grateful to his family who have always been supportive, without which it would have been impossible to achieve anything.

ABSTRACT

In the early morning of Wednesday 28th of September 1994, 82 years after the sinking of, **"M/S Titanic"**, the world witnessed yet another maritime disaster, i.e. **"M/S Estonia"** with nearly the same number of human casualty. Although it is too soon to determine precisely the main cause or causes of this accident, it is suspected that the bow door might have been breached immediately before the sinkage. In such a case one question should be answered:

Had the ship undergone a close and proper survey and inspection prior to her departure, could this tragedy happen?

On the other hand, after introducing comprehensive sets of rules and regulations by the international community during recent years, the issue of the implementing them has been raised. Especially the developing countries are facing this problem in a broader aspect. In this regard one of the major contributing factors is the shortage of qualified personnel.

The above two issues are highlighting the need for training of qualified personnel as surveyors in maritime safety administrations. In this paper the attempt has been made to provide guidelines for the training of the nautical surveyors as being most necessary for any maritime administration.

The introductory chapters provide the general knowledge about maritime conventions and the related surveys and certification. Chapters Three, Four and Five introduce the international maritime conventions and discuss the relevant survey, inspection and certification provisions. Maritime Investigation and Port State Control are dealt with in chapters Six and Seven respectively. In chapter Eight a training scheme has been proposed, based on the material given in chapters One through Seven. Since the first seven chapters can supply relevant and useful information to enrich the training course, it is intended that while establishing a training course according to the proposed scheme in chapter Eight, reference be made to the chapters One to Seven. The paper is concluded in chapter nine with the necessary recommendation and conclusion.

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CHAPTER ONE

INTRODUCTION

To ensure the implementation of standards regarding safety of life at sea and prevention of marine pollution the necessary surveys and inspections have to be carried out for the issue of the required certificates. In this regard the first important steps will be to ensure that;

- Maritime Administration has the necessary infrastructure with adequate technical officials; and
- The required regulations and rules are promulgated for the purpose of implementation of the administration's goals and objectives.

Performing the duties and responsibilities of the maritime administration would be the second step in that respect.

The primary and vital duties and responsibilities of the Maritime Safety Administration are those intended to ensure the safety of life and protection of marine environment.

In this regard the following functions are expected to be performed (Vanchiswar, vol. I):

1. General superintendence and co-operation;
2. Registration of ships and related functions;
3. Surveys, Inspections and Certification of ships, along with related activities;

4. Examination and Certification of seafarers;
5. Manning of the ships;
6. Conducting inquiries/Investigations into shipping casualties;
7. Dealing with matters pertaining to prevention/control and combat of marine pollution;
8. Dealing with matters pertaining to maritime Search and Rescue;
9. Crew matters in general;
10. Ensuring Safety of fishing vessels and other small crafts;
11. Deal with wrecks in national jurisdiction;
12. Advising the Government on all maritime technical matters.

In order to enable the aforesaid multifarious and highly skilled functions to be carried out there is the essential need for duly qualified and trained personnel, including specially surveyors.

The prime objective of those qualified personnel must be the implementation of the flag state responsibilities as regards safety of life at sea and protection of marine environment.

Generally the very wide field of the survey, inspection and certification and the level of expertise required, have given rise to the need for co-operation with classification societies. Classification Societies have been playing an important role in upgrading the safety standards. It should be also noted that subjecting to the complete supervision of the administration, they can be treated as the partners of the administration in implementing the safety measures.

A classification society as a maritime administration's partner, provides an independent assessment of the vessels' condition and also serves as a backup to the owners' maintenance and repair program.

The majority of the maritime administrations today are enjoying the co-operation with classification societies. However it is essential to both maritime administration and classification society that they become clearly aware of the extent of the delegation afforded by the administration to the classification society.

Further more there should be comprehensive and effective mechanism of control and supervision over the classification societies concerned.

The need for training of the Surveyors

As my predecessors in Maritime Safety Administration Course from I.R.Iran have argued in their dissertations (Mohit and Anaraki); with the shortage of qualified surveyors and necessary rules and regulations and also a system for surveying and inspecting of ships, there is no other alternative for carrying out the administration's obligations, than the complete delegation of this important task.

Thereafter they suggested and emphasised on recruiting and training of the surveyors as a means to ensure the safety of life and protection of marine environment.

Nevertheless, the author believes that, "When the problems are an accumulation of marginal things, each on the line, but together adding up to a sub-standard ship, it is a tough surveyor and unusual classification society which does not back down in the face of determined arm-twisting by the owner. The only person who is not subject to that arm-twisting is the government surveyor"(Fairplay 3).

However with due regard to the existence of qualified personnel presently in the administration, full and overall delegation as above should not be considered as a fair practice any more. In chapter two, the surveys which in my opinion should never be delegated, are mentioned.

To my knowledge up to this date, due to other priorities, no attempt has been made in Iran, to establish a training course for the nautical surveyors and therefore the author likes to introduce the present paper, wishing this to be of help in this regard. The minimum required knowledge for a surveyor in order to fulfil flag state obligation as regards survey and certification, is that he knows, on the basis of his field of expertise, how to:

i. Perform survey and inspection on board of new buildings to ensure their compliance with relevant codes and standards;

ii. Verify any deficiency in any existing ship and require rectification of such defects; and

iii. Issue and endorse the relevant certificates and documents according to respective legislation.

The goals of these guidelines may be enumerated as follows:

1. Improvement of safety of ships and the persons on board;
2. Efficient inspection of the ships by exercising firstly, flag state and then port state obligations;
3. Improvement of the safety and health conditions on board ships (working environment).

Chapter two provides general information regarding maritime conventions, survey and certification of ships. Chapters three through seven are respectively introducing:

- The SOLAS Convention and its required certificates;
- The MARPOL Convention and its required certificates;
- Other international maritime treaties and their required certificates and documents;
- Maritime Investigation and Inquiry;
- Port State Control.

These chapters are based on the international maritime treaties and intend to create a foundation and background knowledge. In chapter eight a training scheme is proposed. The paper is concluded in chapter nine by recommendations and conclusion.

CHAPTER TWO

General

2.1. Maritime Treaties

Maritime conventions are primarily drawn up by the International Maritime Organisation. The frame of a convention may be defined briefly as follows:

- Final act of conference
  Consists of, among other, a list of represented states and officers with special duties at the conference.

- International Convention
  This is an attachment to the Final Act and consists of articles providing general obligations, procedures for adoption of amendments, entry into force etc.

- Annexes
  Annex is normally an integral part of the convention and gives a more technical detailed description of the coverage of the convention.

There may be one or more protocols linked to the convention, one or more appendixes to the annexes and often there is an attachment to the convention which contains resolutions.

The long list of the amendments to the international conventions (such as SOLAS) demands a thorough knowledge of the conventions and amendments and the specific requirement of each from the surveyor side. The specific requirements are, for example, year of build,

minimum tonnage applicable to and date of entry into force; therefore the administration surveyor is expected to be able to determine what are the applicable requirements in each case.

However, presently, there are two computer programs (IMO-VEGA developed jointly by IMO and Det Norske Veritas and, Rule Finder developed by Lloyds of London) in order to assist the parties involved in this respect, but since they need appropriate computers to run the programs, still there is a long way to go before it becomes a well promulgated method.

2.2. Responsibility

The Flag State responsibility as regards to flag state control can be categorised as the following three stages:

.1. Plan Approval;
.2. Survey and Inspection;
.3. Certification.

2.2.1. Plan Approval

Prior to starting any approval procedure of a ship, it shall be ascertained as to which regulations the ship is to comply with; the same holds good at all different stages, including approval of drawings, inspections, surveys and certification.

The following is a sequence in this respect, which normally a maritime administration encounters:

1. An intending owner approaches the administration with a project to build a ship;

2. The following details are then to be considered:
   i. Type of the ship;
   ii. Convention or non-convention;
   iii. Sections which are to be plan approved;
   iv. Drawings to be submitted;
   v. Clarification of the parts to be covered by administration surveyor and parts to be undertaken by classification society;
   vi. Clarification about the issuance of the certificates.

3. Drawings for approval are to be submitted to the administration, which, after necessary treatment (adjustment) and approval, will return them to the owner or the shipyard with a copy to the surveyors.
The main plans and particulars include, among others, the following:

i. Safety plan and plan of LSA arrangement;
ii. Fire control plan;
iii. General arrangement;
iv. Hull structure plan, (scantling, material);
v. Subdivision arrangements and calculations;
vi. Subdivision structural details (loading, damage);
vii. Other structural arrangements below and above deck;
viii. Stability information;
ix. Details of fire protection and miscellaneous items;
x. Main and auxiliary machinery and steering gear;
xi. Electrical installation and equipment;
xii. Bilge and ballast system;
xiii. Cargo piping system and vent piping;
xiv. Any other document and plan relevant to the case.

4. The Initial survey is to be carried out and Initial Survey Reports are to be completed. After successful completion of the survey, the relevant certificates are issued.

Since generally the maritime safety enactments are based on international safety instruments, a thorough knowledge of relevant international conventions is essential. Additionally a thorough knowledge of the national legislation is also necessary because the national legislation may be more detailed, cast in different format, and may prescribe additional requirements. However, if any regulation is to be further clarified, then explanatory notes or "instructions for the guidance of surveyors" shall be produced. In the Reports, each item should be linked to a specific relative national or international regulation.

2.2.2. Survey

It must be noted that obligations of the governments under the conventions dealing with Maritime Safety are of two main types:

1. As a Flag State, by ensuring that its own ships meet the standards of the Conventions which have been incorporated into the national legislation.

The allocation of available resources in most developing maritime countries are not extensive enough to perform all its obligations and it is a question of judgement as to which of these obligations are to be performed by officers of the Administration and which can be entrusted to organisations recognised by the maritime administration of the country.

However, it is considered as an acceptable practice to delegate the execution of all the surveys, except the two most important, which must not be delegated to any organisation, but must be carried out by officers of the Maritime Safety Administration;
they are, namely:

- Cargo Ship Safety Equipment Survey; and
- Passenger Ship Safety Survey.

In every case the Administration shall fully guarantee the completeness and efficiency of the survey or inspection and shall undertake necessary measures to ensure satisfactory implementation of this obligation.

2. As a Port State, by ensuring that foreign ships visiting its ports are safe and up to the prevailing standards in order to proceed to sea and not likely to cause major threat to the human safety and/or environment.

In general, Port State Control is to be performed by Government Surveyors.

Following each survey and inspection, a comprehensive report should be made containing, among others, the following facts:
a) The items checked with reference to relevant regulations;
b) The date and place of the check or control carried out;
c) The person(s) who carried out the various parts of the survey.

It should be clearly mentioned whether it was the classification society, a nominated surveyor or if it was the Administration, and who has done the work.

In initial survey not only the equipment has to be type approved but also the installation of the equipment should be checked to ensure that it has been carried out satisfactory.

Taking as an example, the Survey of Safety Equipment, having finished the initial survey, which includes completing the survey report, the record of the ship's safety equipment should be filled in.

In shipping, the term survey can be interpreted as 'authorised, independent examination, inquiry, inspection, measurement and testing made or supervisions done, by surveyors appointed or nominated, by administration or classification societies.'

The surveyor should ensure the following:

1. That the ship is built and equipped according to the approved drawings;
2. All materials and their measurements are according to the standards prevailing at the time of construction;
3. The workmanship of the ship and its equipment is such as to comply with the national and international rules and can withstand the general condition of the sea.

Surveys, from the point of view of the flag state obligation, can be categorised as follows:

1. Initial Survey
2. Renewal Survey
3. Intermediate survey
4. Annual Survey
5. Additional Survey
6. Unscheduled inspection

In any case the nautical surveyor should not confirm the seaworthiness of a ship until and unless all other surveys and inspection (machinery, radio installation, etc.) have been successfully carried out and no major deficiency has been found during such surveys.

2.2.3. Certification

The development of rules, guides, standards and other criteria for the design and construction of ships and their equipment are meant to satisfy certification requirements. The certification can be divided into two groups of activities, namely:

- **Design and construction :**

1. Plan approval review;
2. Surveys of approved materials, prefabricated components, assembly and product; and
3. Survey of ships at the time of assembly and fabrication.

❁ **In operation survey:**

This consists of :

1. Verifying the existing certificates' validity;
2. Inspection of construction and equipment in order to ensure compliance with the requirements for the certificate, in accordance with relevant rules and regulations; and
3. Requiring the administration to issue new certificate or renew existing certificate, as the case may be.

Many of the conventions, resolutions and codes adopted by IMO and other international bodies engaged with maritime affairs require the ships to be provided with certificates. They are normally issued after a survey or inspection has been carried out by flag state authority or other authorised organisations.

The certificates are playing an important role in ensuring the safety at sea, prevention of pollution and control procedures world wide, since they are:

- Proof that a survey or inspection has been carried out on the ship;
- Evidence that a ship complied with applicable stated technical requirements at the time of survey or inspection;
- Statement of the date of next survey.

In the following three chapters the major international maritime treaties and relevant certificates and document are examined. This is done for two reasons:

1. The nautical surveyor needs to be trained with regard to the requirements of national and international legislation; and
2. The surveyors become accustomed to work with national and international legislation in order to update themselves continuously during the service.

Recommendation

The author has witnessed the usefulness and effectiveness of the so called "Survey and Inspection Booklet" in the four Scandinavian countries (Denmark, Finland, Norway and Sweden). It acts in the maritime administrations as a tool to facilitate control and follow-up actions, and on board the ships as an aid to crew and surveyors. Hereby it is proposed that such a "Survey and Inspection Booklet" be developed by the Ports and Shipping Organisation of I.R. of Iran (P.S.O.).

In brief the Survey and Inspection Book should contain:

1. Particulars of the ship;

2. General information about construction and building;
3. All the national and international certificates which are required to be carried on board;
4. Any alteration or modification, along with the date, signature, and place;
5. Comments and remarks as the result of any survey and inspection;
6. Particulars and description of the:
   i. Life Saving Appliances;
   ii. Fire fighting appliances and procedures;
   iii. Fire pumps, bilge pump;
   iv. P ropelling machinery;
   v. Main and auxiliary steering gear;
   vi. Manoeuvrability and control devices for the machinery;
   vii. Boilers and other pressure vessels;
   viii. Generators and electrical plants;
   ix. Cargo refrigeration plant and air conditioning (AC);
   x. Protection equipment for tankers, chemical carriers;
   xi. Ship's hospital and dispensary;
   xii. Spaces for passengers.

CHAPTER Three

The SOLAS Convention and relevant Certificates and Documents

3.1. International Convention for the Safety of Life at Sea

It was only after the sinking of the Titanic in 1912 that the first international convention on Safety of Life at Sea was drawn up, but its application was unfortunately postponed by the first world war.

A new conference was held in 1929, which basically followed the same format as the 1914 version. This conference resulted in the SOLAS 1929 Convention, which was adopted by 18 nations.

Finally in 1948, a third Convention was signed but did not enter into force until 1952. This Convention was later replaced by the 1960 Convention which entered into force in 1965. The next International Convention on Safety of Life at Sea, signed in 1974, entered into force on 25th, May 1980. SOLAS 1974 has later been modified by the 1978 and 1988 SOLAS Protocols, and the amendments of 1981, 1983, 1987, 1988, 1989, 1990, 1991, 1992 and 1994.

SOLAS is applicable to all ships engaged on international voyages, except:

- Ships of war and troopships;
- Cargo ships of less than 500 tons gross tonnage (300 for radio);
- Ships not propelled by mechanical means;
- Wooden ships of primitive build;
- Pleasure yachts not engaged in trade ;
- Fishing vessels.

As stated earlier, there are a number of protocols and amendments to the SOLAS 74 Convention; the complete list is given in the annex of this paper. Nevertheless, due to importance of the Protocols of 1978 and 1988 to the Convention, the author wishes to mention the main changes made by these two protocols.

❁ **Protocol of 1978**

The major factors in the convention affected by the Protocol of 1978 are:

- New requirements to steering gear and inert gas;
- Mandatory annual and intermediate surveys;
- Concept of control of the ships (Port State Control).

❁ **1988 Protocol**[1]

The International Conference on the Harmonised System of Survey and Certification, (H.S.S.C.)

The SOLAS, MARPOL and Load Line Conventions require the issuing of certificates. It is done to show that the relevant requirements have been met, which in turn is ensured through the execution of survey and inspection. This can involve the ship being out of service for several days and since the dates of surveys and inspections and their intervals do not always coincide, a ship has to be off service and laid in dry dock more than once for different surveys, while it is preferable if they can all be done at once.

Therefore the International Conference on Tanker Safety and Pollution Prevention 1978 adopted a resolution calling upon IMO to develop a harmonised system. It was decided to adopt two protocols for SOLAS and Load lines which enter into force at the same time and an amendment for MARPOL[2]. Eventually it led to adoption of Protocol of Harmonised System of Survey and Certification 1988 (H.S.S.C. 1988) to SOLAS 74/78 and LOAD LINES 66 Conventions.

The harmonised system provides:

1. Initial survey;
2. A one-year standard intervals between surveys;
3. Renewal survey may be completed within three months before the expiry date of the existing certificate;

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[1]The 1988 Protocol (H.S.S.C. 1988) is not yet in force

[2]The adoption of Protocols (SOLAS and Load Lines) have to be made by means of positive acceptance while Marpol can be amended by a tacit acceptance

4. A maximum period of validity of five years for cargo ships' certificates;
5. A maximum period of validity of 12 months for the Passenger Ship Safety Certificate;
6. A system for the extension of certificates limited to three months;
7. No unscheduled inspections but annual surveys are mandatory for cargo ships;
8. Intervals between the periodical surveys of equipment covered by the Cargo Ship Safety Equipment Certificate are alternatively at intervals of two and three years instead of two years;
9. Intermediate surveys are required by all ships holding the Cargo Ship Safety Construction Certificate;
10. Inspections of the outside (at least two during five years period) of the ship's bottom are required for all cargo ships;
11. All cargo ship certificates may be issued for any period of validity up to and including five years;
12. There is provision for a combined Cargo Ship Safety Certificate.

With regard to the 1966 Load Line Convention, the principal change to the requirements for survey and certification is the introduction of similar extension provisions and linking of the period of validity of the new to start from the expiry date of existing certificate before its extension.

3.2. Certificates and Documents

In this chapter the details regarding the certificates and documents with respect to the SOLAS Convention are to be dealt with. As mentioned earlier chapters two through six are considered as a foundation and background knowledge. In chapter seven a training scheme will be introduced.

The following are the list of the Certificates and Documents required under the SOLAS 74/78 as amended which are to be dealt with in this chapter:

1. **Cargo Ship Safety Equipment Certificate;**
2. **Cargo Ship Safety Construction Certificate;**
3. **Cargo Ship Safety Radio Certificate;**
4. **Passenger Ship Safety Certificate;**
5. **Minimum Safe Manning Document;**
6. **Intact Stability Criteria Booklet;**

7. **Documents of Authorisation for the Carriage of Grain;**
8. **Dangerous Goods Manifest or Stowage Plan;**
9. **Documents of Compliance with the Special Requirements for Ships Carrying Dangerous Goods.**

3.2.1. Cargo Ship Safety Equipment Certificate

According to chapter one regulation 12 of the SOLAS 74/78 the Certificate shall be issued after inspection to a cargo ship which complies with the relevant requirements of chapters II-1, II-2 and III of the SOLAS 74/78 Convention and any other relevant requirements.

In order to maintain the validity of the Safety Equipment Certificate, mandatory annual survey has to be carried out within three months before or after the anniversary date of the certificate. In initial survey all of the items are subject to type approval and also approval after installation on board.

Some maritime administrations accept the type approval of the equipment by another authority and some other require the type approval to be done only by the organisations and or institutes recognised directly by them. However, the national rules and codes normally govern the extent, details and standards of type approval.

The thoroughness or stringency of the survey should depend upon the condition of the ship and its equipment. This primarily depends on the professional judgement of the surveyor; however, random checks on well maintained vessels will be accepted.

The certificate shall be supplemented by a Record of Equipment and in addition also, Record of Equipment required by Amendment to SOLAS on the Global Maritime Distress and Safety System, 1988 (G.M.D.S.S. 1988).

Cargo Ship Safety Equipment Certificate shall be issued for a period not exceeding 24 months. The Exemption Certificate shall not be issue for longer than the period of the validity of the main Certificate to which it refers.

The certificate shall cease to be valid:

1. If the required inspections and surveys are not carried out within the specified period.
2. Upon transfer of the ship to the flag of another state.

However in the case of major alteration to the ship or Life Saving Appliances, so that it affects the status of the ship with regards to

Safety Plan and LSA arrangement, then the Safety Plan and LSA arrangement have to be approved again, before the Safety Equipment Certificate be revalidated or be renewed.

3.2.2. Cargo Ship Safety Construction Certificate

According to SOLAS 74/78 Convention Chapter one regulation 12; this Certificate shall be issued after survey to a cargo ship which satisfies the requirements for cargo ship on survey set out in regulation 10 of chapter I and chapters II-1 and II-2 of Solas, other than those relating to fire extinguishing appliances and fire control plans.

The cargo Ship Safety Construction Certificate shall be issued for a period not exceeding five years. The Exemption Certificate shall not be valid for longer than the period of the main Certificate to which it refer. No extension of the five-year period of validity of the Cargo Ship Safety Construction Certificate shall be permitted.

The certificate shall cease to be valid:

1. If the required inspections and surveys are not carried out within the specified period.
2. Upon transfer of the ship to the flag of another state.

A ship holding Safety Construction Certificate is subjected to:

- **Initial Survey**
  Before the ship is put into the service
- **Periodical Survey**
  At interval of not more than five years
- **Additional Survey**
  Whenever the administration requires.

In order to issue or to renew the Cargo Ship Safety Construction Certificate, the following items among others, are the major items for survey and inspection:

- Stability Information;
- Subdivision and stability;
- Subdivision and damage stability;
- Damage control;
- Emergency source of electrical power;
- Bilge pumping arrangements;
- Structural Fire safety general measures;
- Fire doors and fire resisting division;

- Fire doors and fire resisting division;
- Watertight doors and construction;
- Precaution against shock, and hazards of electrical origin;
- Communication between Bridge and Engine Room;
- Machinery installation and control systems;
- Means of going astern;
- Steering gear and auxiliary steering gear;
- Special arrangements in machinery spaces;
- Fire protection in machinery space;
- Manoeuvring information
- Ventilation System;
- Fire protection arrangements in cargo spaces;
- Ro-Ro cargo spaces , vehicles with fuel in their tanks;
- Additional requirements for closed Ro-Ro spaces;
- Means of escape.

3.2.3. Cargo Ship Safety Radio Certificate

1. Certificate

The Cargo Ship Safety Radio Certificate according to chapter one of the SOLAS 74/78, shall be issued for a period not exceeding 12 months. The ship should comply with the requirement of chapter IV of the SOLAS as amended in 1988 to cover GMDSS.

The extent of the requirements and certificates required is dependent on the sea area (A1 through A4) in which the ship is sailing. As stated in the 1988 Amendment to the SOLAS, (GMDSS 1988) the ships complying with the requirement of GMDSS as regards duplicated equipment, are exempted from carrying radio officer on board.

The certificate shall be supplemented by a Record of Equipment required by 1988 SOLAS Amendment on the Global Maritime Distress and Safety System, 1988 (G.M.D.S.S. 1988).

The certificate shall cease to be valid:

1. If the required inspections and surveys are not carried out within the specified period.
2. Upon transfer of the ship to the flag of another state.

The survey of radio installation is normally done by a radio surveyor or by the inspectors from the Telecommunication Department. But in special cases, the nautical surveyor would be able

to verify the extent of compliance of the ship with current regulations and/or approved Record of Equipment.

He can also check the relevant Radio Certificate. Furthermore, he may inspect the Radio Log to ensure that the required watches have been maintained. Nevertheless, he would be able to carry out radio test, only if he is holding the relevant certificate.

3.2.4. Passenger Ship Safety Certificate

1. Certificate

According to chapter one regulation 12 of SOLAS 74/78 Convention, the Passenger Ship Safety Certificate shall be issued after inspection and survey to a passenger ship which complies with requirements of chapters II-1, II-2, III and IV and any other relevant requirements of the SOLAS 74/78 Convention.

The Certificate shall be supplemented by a Record of Equipment considering the exemptions (if any) and in addition also Record of Equipment required by Amendment to SOLAS on the Global Maritime Distress and Safety System, 1988 (G.M.D.S.S. 1988).

The Passenger Ship Safety Certificate shall be issued for a period of not exceeding 12 months.

A certificate called an Exemption Certificate shall be issued in addition to above whenever an exemption is granted from any requirement, by the administration. It shall not be valid for longer than the above mentioned period.

A Passenger Ship is subject to the following surveys:

- **Initial Survey**, before the ship is put into service
- **Periodical Survey**, at intervals of maximum 12 months
- **Additional Survey**, by the administration when occasion arises.

The following main areas are covered by Passenger Ship Safety Surveys:

- Structure;
- Sub-division and stability (including damage stability);
- Life saving appliances and arrangements;
- Fire detection and protection;
- Fire extinguishing systems (fixed and portable);
- General alarm, fire alarm;
- Public Address system (P.A.);
- Nautical publications;
- Ship borne navigational equipment;

- Lights, shapes and means of making sound signals;
- Means of distress signal;
- Radio installation;
- Main and auxiliary machinery;
- Inside and out side of boilers;
- Other pressure vessels;
- Electrical installations;
- Means of embarkation for pilot;
- Protection of special category spaces;
- Ship's bottom;

The certificate shall cease to be valid:
1. If the required inspections and surveys are not carried out within the specified period.
2. Upon transfer of the ship to the flag of another state

3.2.5. Minimum Safe Manning Document

Regulation 13, chapter five of the SOLAS 74/78 Convention requires the governments to adopt and maintain measures for the purpose of ensuring that, from the point of view of safety of life at sea, all ships shall be sufficiently and efficiently manned. Resolution A. 481/XII, "Principles of Safe Manning", defines the safe manning as follows:

"... safe manning is a function of the number of qualified or experienced seafarers necessary for the safety of the ship, crew, passengers, cargo and property and for the protection of the marine environment."

Content of the Safe Manning Document as stated in Annex one to the Resolution should be:

"1. A clear statement of the ship's name, its port of registry and its distinctive number or letters;

2. A table showing the numbers and grades of the personnel required to be carried, together with any special conditions or other remarks;

3. A formal statement by the Administration that, having regard to the principles and guidelines set out in this Resolution and in Annex two, the ship named in the document is considered to be safely manned if, whenever it proceeds to sea, it carries not less than the numbers and grades of personnel shown in the document, subject to any special conditions stated therein;

4. A statement as to any limitations on the validity of the document by reference to particulars of the individual ship and the nature of service upon which it is engaged;

5. The date of issue and any expiry date of the document together with a signature and the seal of the Administration."

The Document is issued by the administration and as long as the conditions stated in the Document have not been changed or modified on board the ship, it will remain valid. According to Resolution A.481 the certificate shall indicate the minimum manning that the flag state considers safe.

According to the guidelines, provided by IMO, the safe manning is "manning of the ship in order to ensure the safe and efficient performing of the following tasks:

- Bridge watch keeping

The capability to maintain a safe navigational watch in accordance with regulation II/1 of the 1978 STCW convention and also to maintain general surveillance of the ship.

- Mooring and unmooring

The capability to moor and unmoor the ship effectively and safely.

- Watertight integrity

The capability to operate all watertight closing arrangements and maintain them in effective condition and also to deploy a competent damage control party.

- Safety equipment, mustering and disembarkation.

The capability to operate all on-board fire equipment and life-saving appliances, to carry out such maintenance of this equipment as is required to be done at sea, and to muster and disembark, non-essential personnel and other crew members.

- Stationary or near stationary ships (e.g. light vessel etc.)

The capability to manage the safety functions of the ship when employed in a stationary or near-stationary mode at sea.

- Engineering watch keeping

The capability to maintain a safe engineering watch at sea in accordance with regulation III/1 of the 1978 STCW convention and also to maintain general surveillance of spaces containing main propulsion and auxiliary machinery.

- Operation and maintenance of machinery

The capability to operate the main propulsion and auxiliary machinery and maintain it in a safe condition to enable the ship to overcome the foreseeable perils of the voyage.

Certificates for Master, Officers or Ratings

Regulation 13, chapter five of SOLAS 74/78 and also IMO Resolution A.481 require that all ships shall be sufficiently and efficiently manned. It is necessary to mention the Article VI of the International Convention on Standards of Training, Certification and Watch keeping for Seafarers, 1978 (S.T.C.W. 1978) which requires the administration to issue the Certificates of Competency for those candidates who meet the requirements of:

- Minimum age;
- Medical fitness;
- Approved sea-going service;
- Training;
- Qualification;
- Examination.

The manning requirement for recruitment of the personnel on board ships is not specified in the STCW Convention, however, it set forth requirement for qualification of officers on board ships. It can be interpreted in the following way:

Deck Personnel*:

1600 GRT and above	200 -1600 GRT	Under 200 GRT
Master	Master	Master
Chief Mate	Chief Mate	W.K.O.
W.K.O.¤	W.K.O.	—

*STCW 1978, chapter II
¤Watch Keeping Officer

Engine room Personnel*:

3000 kW and above	750 KW - 3000 KW	Under 750 KW
Chief Engineer	Chief Engineer	It is to be decided
Second Engineer	Second Engineer	by Administration
W.K.E.O¤	W.K.E.O.	

*STCW 1978, chapter III
¤Watch Keeping Engineer Officer

Radioroom Personnel*:

1600 GRT and above	300 GRT - 1600 GRT
Radio Officer	Radio-telephone Operator

*STCW 1978, chapter IV

3.2.6. Intact Stability Criteria Booklet

According to IMO Resolution A.560 the Intact Stability Criteria Booklet contains simple processes to obtain accurate guidance as to the stability of the ship under varying conditions of service.

A copy of the stability information shall be furnished to the Administration. The purpose of the Document is to ascertain the adequacy of the metacentric height and stability status.

Regulation 22 of Chapter II.1 of the SOLAS 74/78 Convention requires the Intact stability booklet to be supplied to the Master. The regulation also states:

"Every passenger ship regardless of size and every cargo ship having a length, as defined in the International Convention on Load Lines in force, of 24 m and upwards, shall be inclined upon its completion and the elements of its stability determined".

Resolution A.167 as amended by Res. A.206 on "Recommendation on intact stability for passengers and cargo ships under 100 metres in length", explains the methods and procedures employed for calculating stability righting arms, more over Resolution A.562 contains recommendation on a severe wind and rolling criterion for the intact stability of passenger and cargo ships of 24 metres in length and over.

Intact Stability Document

Every ship with the exemption of a sister ship (if the administration so decides) is subject to an inclining experiment. The inclining

experiment is, with the exception of non-convention ships generally carried out by the classification societies on behalf of the administration.

In the case of any alteration and/or modification of the construction in such a way that it affects the stability criteria of the vessel the Stability booklet should be duly amended and endorsed. Failing to do so will cause the stability booklet to be void. If necessary the ship shall be re-inclined for the purpose.

The area covered

Stability information should comprise:

- Stability characteristics of typical loading conditions;
- Information in the form of tables or diagrams which will enable the master to assess the stability of his ship and verify whether it is sufficient in all loading conditions differing from the standard ones. This information should include, in particular, a curve or table giving, as a function of the draughts, the required initial metacentric height GMo (or any other stability parameter) which ensures that the stability is in compliance with the criteria given in the resolution A.206;
- Information on the proper use of anti-rolling devices if these are installed in the ship;
- Additionally, information enabling the ship's master to determine the initial metacentric height GMo by means of rolling test would be desirable;
- Notes on the correction to be made to the initial metacentric height GMo to take account of free surface liquids;
- For ships carrying timber deck cargoes the administration may deem it necessary that the master should be given information setting out the changes in deck cargo from that shown in the loading conditions.
- For ships carrying timber deck cargoes conditions should be shown indicating the maximum permissible amount of deck cargo having regard to the lightest stowage rate likely to be met in service.

According to MSC. Circular number 456 the information included in stability document should be classified as follows:

1. Necessary data to obtain the trim and stability characteristics of ship, including :
   - General information;
   - Arrangement drawing;

- Weight and centres of mass;
- Volumes and centres of volume;
- Free surface effect;
- Light ship particulars and rolling coefficient;
- Hydrostatic particulars;
- Deadweight particulars and details of draught marks;
- Form stability particulars.

2. Optional information, deemed by owners to be useful to the operation of ship.

3. Information which provides means of ensuring that the ship's stability parameters lie within the limits. Information under this category should include the following:

- Stability criteria;
- Details relating to the assigned load line;
- Critical stability data;
- Conditions of loading;
- Master's instruction.

3.2.7. Documents of Authorisation for the Carriage of Grain

Regulation 10, Chapter VI of SOLAS 74/78 Convention states: "A document of authorisation (for carriage of grain) shall be issued for every ship loaded in accordance with the regulations of the chapter six of SOLAS either by the Administration or an organisation recognised by it or by a Contracting Government on behalf of the Administration.

It shall be accepted as evidence that the ship is capable of complying with the requirements of the relative regulations. In addition, however, an approved grain stability book, which is a booklet of stability information examining various grain loading conditions, should be kept on board. The document shall accompany and refer to the grain loading stability booklet".

The grain loading stability booklet should include the following information :

- Ship's particulars;
- Lightship displacement and the vertical distance from the intersection of the moulded base line and midships section to the centre of gravity (KG);
- Table of free surface corrections;

- Capacities and centres of gravity of the holds;
- Curves or tables of grain moments for every compartment, filled or partly filled, or combination thereof, including the effects of temporary fitting;
- Tables of maximum permissible heeling moments or other information sufficient to allow the master to demonstrate compliance with the requirements of paragraph (c) of regulation 4 of this chapter;
- Details of the scantlings of any temporary fittings and where applicable the provisions necessary to meet the requirements of section I(E) of part C of this chapter;
- Typical loaded service departure and arrival conditions and where necessary, intermediate worst service conditions;
- A worked example for guidance of the master;
- Loading instructions in the form of notes summarising the requirements of this chapter.

The document will be valid as long as no major alteration or modification which can affect the stability criteria of carriage of grain, have been carried out on board the ship.

Because of the special nature of grain cargoes and the possibility of cargo shifting, when the vessel is en-route, it is of the utmost importance that instructions, both general and particular, concerning the stowage, prevention of shifting, and stability be kept on board the vessel.

The nautical surveyors shall, during the training, familiarise themselves with:

a. Heeling moments, and related curves and tables;
b. Free surface effect, free surface calculation, correction and its tables;
c. Calculation of the centres of gravity;
d. Framing, scantling;
e. Methods used for securing the grain;
f. Vessel construction and maximum ability of the vessel to withstand stresses.

3.2.8. Dangerous Goods Manifest or Stowage Plan

According to SOLAS 74/78 Convention Chapter VII regulation 5: "Each ship carrying dangerous goods shall have a special list or manifest setting forth in accordance with the classification set out in regulation 2 chapter VII of the SOLAS 74/78, the dangerous goods on board and the location thereof.

A detailed stowage plan which identifies by class and sets out the location of all dangerous goods on board may be used in place of such special list or manifest".

According to regulation four of Annex III of the MARPOL 73/78 all documents relating to the carriage of harmful substances by sea, shall contain the correct technical name of each such substance used and the substance shall further be identified by the addition of the words MARINE POLLUTANT.

Further more, each ship shall have a special list or manifest showing the harmful substances on board and the location thereof. They may be combined by the documents required by the SOLAS Convention, mentioned above, but then a clear distinction shall be made between dangerous goods and harmful substances covered by Annex III of MARPOL Convention.

Regulation six of chapter VII SOLAS Convention explains the stowage requirements which should be observed by ship's personnel and controlled by administration surveyors. They are summarised as follows:

a. Dangerous goods shall be stowed safely and properly;
b. Incompatible goods shall be segregated;
c. Explosives with serious risk shall be stowed in a magazine and segregated from detonators;
d. Dangerous goods in packaged form which give off dangerous vapours shall be stowed in a mechanically ventilated space or on deck;
e. Special precautions shall be taken when carrying flammable liquid or gases;
f. Adequate precautions shall be taken for substances which are liable to spontaneous heating or combustion.

The International Maritime Dangerous Goods Code contains recommendations for the handling, stowage, classification, documentation, labelling, packaging and segregation of various types of hazardous cargoes. This five volumes publication also has

recommendations concerning fire-prevention and fire-fighting. It is strongly recommended that the administration surveyor not only familiarise himself with the Code but also consult with it whenever in doubt (the Code should be regularly updated). A copy should also kept on board, together with any other national regulations applicable to the carriage of dangerous goods in ships.

More over, the vessel should carry a copy of the IMO publication of Medical First Aid Guide for Use in Accidents Involving Dangerous Goods.

3.2.9. Documents of Compliance with the Special Requirements for Ships Carrying Dangerous Goods

The Administration shall provide the ship with an appropriate document as evidence of compliance of construction and equipment with the requirements specified in chapter II.2 of SOLAS Convention 74/78.

Recommendation

Considering the following:

1. The existence of qualified surveyor in the P.S.O. (although not in sufficient number); and
2. That presently all of the statutory surveys and issuance of the relative certificates under the SOLAS and other maritime conventions, to which the Islamic Republic of Iran is a party, are being carried out by the classification societies recognised by the Ports and Shipping Organisation of Iran (and also not denying the expertise and experience of the classification societies' surveyors),

the author is of the opinion that at least the **Cargo Ship Safety Equipment Survey** and **Passenger Ship Safety Survey**, should be carried out by the surveyors of and under the direct supervision of administration.

To achieve the above, it is of great importance to initiate a training program for training and recruitment of sufficient number of qualified personnel in the administration.

CHAPTER FOUR

The MARPOL Convention and relevant Certificates and Documents

4.1. International Convention for the Prevention of pollution from Ships 73/78 (MARPOL 73/78)

The 1954 oil pollution convention was the first major attempt by the maritime nations to curb the impact of oil pollution. But in the years that followed, the pollution threat increased dramatically and, since coming into existence, IMO has devoted increasing attention to the problem of marine pollution. The 1954 convention was amended in 1962, but the wreck of the Tory Canyon in 1967 dramatically alerted the world to the great dangers which the transport of oil posed to the marine environment.

Following this disaster, IMO produced a series of conventions and other instruments including further amendments to the 1954 convention which were adopted in 1969.

The continuing boom in the transportation of oil and the increasing scale of oil pollution incidents resulted in serious international concern for the marine environment, not only as a result of accidents but through routine tanker operations, notably the cleaning of cargo tanks.

In 1971, the 1954 Oil Pollution Convention was further amended to limit the hypothetical outflow of oil resulting from an accident. But it was generally felt that a completely new instrument was required to control pollution of the seas from ships and, in 1973, IMO convened a major conference to discuss the whole problem of marine pollution

from ships. It resulted in the adoption of the first ever comprehensive anti-pollution convention, the International Convention for the Prevention of Pollution from Ships (MARPOL 1973).

The convention deals with not only pollution by oil, but also pollution from chemical and other harmful substances, garbage, and sewage. Most of the technical measures are included in five annexes as follows;

- Annex I OIL;
- Annex II Noxious Liquid Substances in Bulk;
- Annex III Harmful Substances in Packaged Forms;
- Annex IV Sewage;
- Annex V Garbage.

4.2. Certificates and Documents

The following Certificates and Documents which are required under the MARPOL 73/78 Convention will be explained in this chapter:

1. **International Oil Pollution Prevention Certificate (I.O.P.P. Certificate);**
2. **Oil Record Book;**
3. **International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk (NLS Certificate);**
4. **Cargo Record Book.**

4.2.1. International Oil Pollution Prevention Certificate (I.O.P.P. Certificate)

Annex I to the MARPOL 73/78 Convention introduces an International oil Pollution Prevention Certificate for oil tankers of 150 gross tonnage and more and other ships of 400 gross tonnage and above. The Certificate should be issued after survey in accordance with particulars in regulation four of the annex I to the Convention.

The Certificate shall be issued for a period of not exceeding five years from the date of issue. In the following cases the validity of the certificate is cancelled:

1. A certificate shall cease to be valid if significant alterations have taken place in the construction, equipment, systems, fittings, arrangements or material required;
2. If intermediate surveys are not carried out;
3. Upon transfer of the ship to another flag.

According to the MARPOL 73/78 Convention the following surveys are mandatory:

- Initial Survey
- Mandatory Annual Survey
- Intermediate Survey
- Periodical (Renewal) Survey

The Marine Environment Protection Committee (MEPC), by Resolution MEPC 11/18 adopted guidelines for surveys required under Annex I to MARPOL 73/78. The purpose of these guidelines is to provide agreed international standards for conducting Initial, Annual, Intermediate and Periodical (Renewal) Surveys.

4.2.2. Oil Record Book

According to regulation 20 of Annex I to the MARPOL 73/78 Convention every oil tanker of 150 gross tonnage and other ships of 400 gross tonnage and above shall be provided with an Oil Record Book Part I (Machinery Space Operations).

In addition every oil tanker of 150 gross tonnage and above shall also be provided with an Oil Record Book Part II (Cargo/Ballast operations).

The oil Record Books shall be completed in the case of each of the following operations:

4.2.2.1. Part I, Machinery Space Operation:

- Ballasting or cleaning of oil fuel tanks;
- Discharge of dirty ballast or cleaning water from the above tanks;
- Disposal of oily residues (sludge);
- Discharge over board or disposal otherwise of bilge water which has accumulated in machinery spaces;

4.2.2.2. Part II, Cargo/Ballast Operations:

- Loading of oil cargo;

- Internal transfer of oil cargo during voyage;
- Unloading of oil cargo;
- Ballasting of cargo tanks and Dedicated Clean Ballast Tanks;
- Cleaning of cargo tanks including Crude Oil Washing;
- Discharge of ballast except from Segregated Ballast Tanks;
- Discharge of water from slop tanks;
- Closing of all applicable valves or similar devices after slop tank discharge operations;
- Closing of valves necessary for isolation of Dedicated Clean Ballast Tanks from cargo and stripping lines after slop tank discharge operations;
- Disposal of residues.

More over, any oil discharge, accidentally or exceptionally shall be recorded in the Oil Record Book along with the time, reason and the amount of oil. The Book shall be preserved for a period of three years after the last entry has been made.

It is worth noting that for tankers less than 150 tons gross and cargo ships less than 400 tons gross tonnage, the administration should develop appropriate requirements to be as far as practicable and reasonable in harmony with the requirements of the Convention. Accordingly the surveyor should acquaint himself with the provisions of the national legislation and requirements, when attending to such ships.

4.2.3. International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk (NLS Certificate)

Annex II of the MARPOL provides almost the same level of prevention of pollution as Annex I but instead, for the Noxious Liquid Substances in Bulk.

Regulations 11 and 12 of Annex II requires an International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk.

The certificate should be issued after survey and inspection in accordance with the provisions of regulation 10 of the annex II of the MARPOL Convention to any ship carrying noxious liquid substance in bulk which is engaged in international voyages.

International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk shall be issued for a period of not more than five years from the date of issue. In the following cases the validity of the certificate is ceased:

- If significant alterations have been taken place in the construction, equipment, systems, fittings, arrangements or material of the ship;
- Or if intermediate or annual surveys are not carried out;
- Upon transfer of the ship to another flag.

Ships carrying Noxious Liquid Substances in bulk shall be subject to the following surveys:

- Initial Survey
- Periodical Survey
- Intermediate Survey
- Mandatory Annual Survey

4.2.4. Cargo Record Book

According to regulation 9 of Annex II to MARPOL 73/78: "all ships carrying Noxious Liquid Substances in Bulk shall be provided with a Cargo Record Book, whether as part of the ship's official log-book or otherwise".

The same regulation, requires that entry should be made whenever each one of following operations with respect to a noxious liquid substance takes place on board the ship:

- Loading of cargo;
- Internal transfer of cargo;
- Unloading of cargo;
- Cleaning of cargo;
- Ballasting of cargo tanks;
- Discharge of ballast from cargo tanks;
- Disposal of residues to reception facilities;
- Discharge into the sea or removal by ventilation of residues in accordance with regulation five of annex II to the MARPOL 73/78.

Finally, Regulation 9 in Annex II requires that the appointed surveyor, who carries out the supervision of any operations and inspection, makes an appropriate entry in the Record Book.

CHAPTER FIVE

Other Maritime Conventions, Codes and Certificates

In this chapter the certificates and documents required to be carried on board the ships under the international treaties other than SOLAS and MARPOL Conventions are to be examined. They are as follows:

5.1. Certificate of Registry;
5.2. International Tonnage Certificate 1969;
5.3. International Load Line Certificate 1966;
5.4. Special Trade Passenger Ship Safety Certificate;
5.5. Certificate of Insurance in respect of the International Convention on Civil Liability for Oil Pollution Damage (1969 CLC 1969);
5.6. Certificate of Fitness for the Carriage of Dangerous Chemical in Bulk (IBC[1] and BCH[2] Code);
5.7. Certificate of Fitness for the Carriage of Liquefied Gases in Bulk (IGC Code[3]);
5.8. Special Purpose Ships Safety Certificate;
5.9. Offshore Supply Vessels Safety Certificate;
5.10. Diving System Safety Certificate;
5.11. Construction and Equipment Safety Certificate for Dynamically Supported Craft;
5.12. Safety Certificate for Mobile Offshore Drilling Units
5.13. Noise Survey Report;
5.14. Compliance with Convention on International Regulation for Preventing Collision at Sea (COLREG).

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[1]IBC; International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk.
[2]BCH; Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk.
[3]IGC; International Code for the Construction and Equipment of Ship's Carrying Liquefied Gases in Bulk.

5.1. FAL Convention

5.1.1. Certificate of Registry

The Convention on Facilitation of Maritime Traffic (FAL Convention) was adopted by the International Conference on Facilitation of Maritime Travel and Transport on 9 April 1965.

The Convention entered into force on 5 March 1967 and its purpose is to facilitate maritime transport by simplifying and minimising the formalities, documentary requirements and procedures associated with the arrival, stay and departure of ships engaged on international voyages.

The Convention provides "Standards" and "Recommended Practices" on formalities, documentary requirements and procedures regarding:

- Arrival, stay and departure of the ship;
- Cargo and shipping documents (including dangerous cargo);
- Arrival, and departure of passengers;
- Public health and quarantine including sanitary measures for animals and plants.

The following certificates required by the Convention are to be inspected by the surveyor:

- Certificate of Registry; and
- Deratting and or Deratting Exemption Certificate.

However if the nautical surveyor is to be responsible for registration of ships as well, which clearly demands deeper knowledge of legislation in this respect, in addition to relevant national legislation, the following sources are also to be consulted for further information:

- Iranian Maritime Code, 1964 (as updated)
- FAL Convention, 1965
- Convention on the High Seas, 1958
- United Nations Convention on the Law of the Sea, 1982
- United Nations Convention on Conditions for Registration of Ships, 1986.

5.2. International Tonnage Certificate 1969

5.2.1. Certificate

International Convention on Tonnage Measurement of Ships 1969 entered into force on 18 July 1982, according to the Interim Scheme for

Tonnage Measurement[4], measuring of the ship's tonnage according to Oslo Convention should cease on 18 July 1994. The aim of the Convention is: "Establishment of uniform principles and rules with respect to the determination of tonnage of ships engaged on international voyages."

The application of the Convention to the ships engaged on international voyages are defined in Article three as follow:

1. Ships registered in states, which are party to the Convention;
2. Ships registered in territories to which the Convention extended; and
3. Unregistered ships flying the flag of a member state.

With regard to the provision of the para. 2 of the same article and also article 4 and the date of the entry into force of the convention (18 July 1982) it can be concluded that the Convention is applicable to all ships other than:

1. Ships of war;
2. Ships of less than 24 metres in length; and
3. Ships solely navigating in some internal waters including the Caspian Sea.

Tonnage measurement is a rather detailed process and is normally done before the maiden voyage.

As a matter of general practice the tonnage measurement of convention ships are carried out by the classification societies on behalf of the administration. It is worth noting that the full responsibility regarding determination of the tonnages and issuance of the certificate, as a rule, will remain with the Administration.

In each of the following conditions the Certificate ceases to be valid:

1. If alterations have taken place in:

- arrangement;
- construction;
- capacity;
- use of spaces;
- assigned load line marks;
- total number of passengers the ship is permitted to carry (as indicated in the ship's passenger certificate); or

[4]Resolution A. 389/10.

- change in permitted draft of the ship such as would necessitate an increase in gross tonnage or net tonnage.
  2. upon transfer of such a ship to the flag of another State.

It should be appreciated that the "Gross Tonnage" and "Net Tonnage", expressed in the International Tonnage Certificate have no unit and the terms "tons gross tonnage" and "tons net tonnage" are changed and are corresponding to "Gross Tonnage" and "Net Tonnage".

Surveyors duly authorised for exercising flag state control on the convention ships shall carry out the inspection, in order to verify the following:

1. that the ship is provided with a valid International Tonnage Certificate (1969); and
2. that the main characteristics of the ship correspond to the data given in the certificate.

5.3. International Load Line Certificate 1966

5.3.1. Convention

As stated in Attachment One of the Load Line Convention, The aim of the Convention is:

"To establish uniform principles and rules with respect to the limits to which ships on international voyages may be loaded having regard to the need for safeguarding life and property at sea."

The Convention applies to:

- Ships registered in a state party to the Convention,
- Un-registered ships flying the flag of member state, and
- Ships engaged on international voyages.(Article 4)

the Convention shall not apply to:

- Ships of war;
- New ships of less than 24 metres in length;
- Existing ships of less than 150 tons gross tonnage;
- Pleasure yachts not engaged in trade;
- Fishing vessels;
- Ships solely navigating in some internal waters including Caspian Sea (Article 5).

In the case of need for any exemption from compliance with the provision of national or international regulation the administration

should proceed to consider that with great caution, having assessed all the factors involved and ensuring that it shall not prejudice the safety of crew on board.

5.3.2. Certificate

After the completion of survey and marking in accordance with the regulation, according to Article 16 of the Convention the Administration or organisation duly authorised by it shall issue an International Load Line Certificate or International Load Line Exemption Certificate (as the case may be). The Certificate shall be issued for a period, specified by the Administration which shall not exceed five years.

If the required Annual Inspection has not been carried out on board or material alterations have taken place in the hull or superstructures of the ship such as would necessitate the assignment of an increased freeboard, or respective items are not maintained in the proper and effective condition or finally, the structural strength of the ship is lowered to such an extent that the ship is unsafe, then the Certificate shall cease to be valid.

The Load line survey is concerned with reserve buoyancy and the watertight integrity of the ship including, among other things, hatch covers, ventilators, double bottom tank vents, all openings in the shell.

The Load Line surveys require good judgement to perform the assessment of condition of the ship and as to whether equipment or material is satisfactory, serviceable until next survey or should be replaced or repaired immediately. Therefore the Load Line survey requires much more experience than other surveys which may involve only the application of a set of concise rules.

In this regard it should be noted that, unlike some other certificates, the load Line Certificate can not be extended before inspection on board takes place. When the certificate expires, and if there is not enough time for complete survey, the survey should be commenced and progressed to the point where seaworthiness is confirmed at which point a Conditional Load Line Certificate can be issued. The rest of the survey would be carried out in the specified time provided in the certificate.

The following surveys are mandatory for a convention ship:

Initial Survey

An Initial Survey is the survey which takes place as soon as possible after structural parts are in place during outfitting stages. Initial Survey is carried out, in order to check that all regulations in the Load Line Convention are complied with.

More over it is done to carry out the measurements of dimensions used for the calculation of freeboard.

It however, shall include a complete inspection of the structure and equipment to ensure that the arrangements, material, and scantlings fully comply with the requirements of the convention.

Periodical Survey

A Periodical Inspection is carried out in order to ensure that the structure, equipment, arrangements, material and scantlings fully comply with provisions, specified in the Load Line Convention. It is also a supervision that the ship maintains her standard with respect to the freeboard aspects and to ensure that the maintenance and condition of the following fittings and appliances is in an acceptable condition:

i) protection of openings;
ii) guard rails;
iii) scuppers and freeing ports;
iv) means of access to crew's quarters.

Annual Inspection

To follow up the supervision mentioned above, it is required that an Annual Inspection is carried out. The annual inspection shall be carried out in the period from three months before to three months after the anniversary date.

The Periodical Inspection shall be endorsed on the International Load Line Certificate or the International Load Line Exemption Certificate as the case may be. It is worth mentioning that under the Protocol of 1988 to the International Convention on Load Line, 1966[5], the terms Periodical Survey and Periodical Inspection explained above, are to be changed to Renewal Survey and Annual Survey respectively. The Protocol also emphasises that during the Periodical Inspection (Annual Survey) freeboard marks should be checked to ensure that they are correctly and permanently indicated.

[5]The Load Line Protocol 1988 is not yet in force.

Control

The Convention requires the member states to control the ships holding a certificate. This control is very much similar to the control required under regulation 19 chapter I of the SOLAS and shall be limited to the purpose of determining if there is a valid International Load Line Certificate (1966) on board the ship, and also that:

- "the ship is not loaded beyond the limits allowed by the certificate;
- the position of the load line of the ship corresponds with the certificate;
- the ship has not been so materially altered in respect of the matters leading to cancellation of the Certificates as stated before that the ship is manifestly unfit to proceed to sea without danger to human life."

5.4. Special Trade Passenger Ship Safety Certificate

5.4.1. STP Agreement

The are a number of passenger ships involved in the carriage of large number of special trade passengers such as the pilgrim trips. Due to very large number of passengers and the nature of these voyages, clearly these ships can not fully comply with the requirements of SOLAS and Load Line Conventions.

In order to establish a set of minimum achievable standards and requirements, the 1971 International Conference on Special Trade Passenger Ships, 1971, (STP Agreement) adopted "Agreement on Special Trade Passenger Ships" by the support from a number of countries who were party to the SOLAS 1960. Following that, the International Conference on Space Requirements for Special Trade Passenger Ships, 1973, adopted "Protocol on Space Requirements for Special Trade Passenger Ships, 1973" (SPACE STP, 1973).

The Agreement superseded the convention on the same topic called "The SIMLA Rules, 1931". It is concerning the construction and equipment of passenger ships. The Agreement and its Protocol are linked to the SOLAS 60 Convention by the provision in their introduction and in article II .

It is worth mentioning that article VI of the SOLAS 74, recognises the implementation of other treaties relating to safety of life at sea then in force at the time. More over regulation 4 exempts the ships from compliance with the relevant SOLAS requirements, if the Administration finds that it is impracticable to comply with. Therefore

such a ship is accordingly to comply with the provisions of STP 1971 and the Space STP 1973.

5.4.2. Certificate

The Special Trade Passenger Ship Safety Certificate and Special Trade Passenger Ship Space Certificate shall be issued after the ship has been surveyed and inspected in accordance with the STP 1971 and the SPACE STP 1973 conventions.

The above Certificates are issued in addition to the Passenger Ship Safety Certificate and Exemption Certificate, based on the SOLAS convention. The Certificate may be issued for a period of not exceeding twelve months.

5.5. The International Convention on Civil Liability for Oil Pollution Damage 1969 (CLC 1969)

The International Convention on Civil Liability for Oil Pollution Damage 1969 (CLC 1969) establishes a regime of strict liability of the ship owner for oil pollution. The Convention states that the ship owner shall be liable for any pollution damage caused by the ship as result of an incident with certain exemptions.

The Article VII of the Convention states as follows:

" A certificate attesting that insurance or other financial security is in force in accordance with the provisions of this Convention shall be issued to each ship.

It shall be issued by the appropriate authority of the State of the ship's registry after determining that the requirements of this convention have been complied with".

This certificate shall contain the following particulars:

- Name of ship and port of registration;
- Name and principal place of business of owner;
- Type of security;
- Name and principal place of business of insurer or other persons giving security, where appropriate, place of business where the insurance or security is established;
- Period of validity of certificate which shall not be longer than the period of validity of the insurance or other security.

5.6. Certificate of Fitness for the Carriage of Dangerous Chemical in Bulk (IBC and BCH Code)

5.6.1. Certificate

A certificate of Fitness can be issued to a ship complying with the IBC/BCH codes (as the case may be). The certificate should be given a validity of maximum five years. It shall list all chemicals which the ship is allowed to carry. That is why the certificate frequently constitute rather bulky documents.

The surveyors should note that these certificates are also used as a document of compliance with MARPOL 73/78 Annex II. In case of chemical tankers, it does not require a separate certificate.

Vessels holding certificates of Fitness are subject to annual surveys as well as intermediate survey during the maximum five years interval between each Periodical (Renewal) Survey.

All these surveys must also when relevant, include the survey requirements of Annex II to MARPOL 73/ 78.

It should be clarified that, under the provision of regulation 13 of annex II of MARPOL 73/78 and chapter VII of the SOLAS Conventions, chemical tankers constructed before 1 July 1986 must comply with the provisions of Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk, **BCH Code,** and ships constructed on or after that date must comply with the provisions of the International Code for the Construction and equipment of Ships Carrying Dangerous Chemicals in Bulk, **IBC Code.**

The purpose of the Codes (BCH or IBC Codes) is to recommend suitable design criteria, construction standards and other safety measures for ships transporting dangerous and noxious chemical substances in bulk so as to minimise the risk to the ship, its crew and the environment.

As stated in chapter one of the Code, it applies to ships regardless of size, engaged in carriage of bulk cargoes of dangerous and noxious chemical substances, other than petroleum or similar flammable products as follows:

- Products having significant fire hazards in excess of those of petroleum products and similar flammable products.
- Products having significant hazards in addition to flammability.
- Products which may present a hazard to the environment, if accidentally released.

5.6.2. Survey and Inspection

The structure, equipment, fittings, arrangements and material[6] of a chemical tanker should be subjected to the following surveys:

Initial Survey

An initial survey in order to ensure that the ship fully comply with the applicable provisions of the Code. It should be carried out before the ship is put into service or before the Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk is issued for the first time.

Periodical Survey

The Periodical Survey or Renewal Survey is carried out at intervals specified by the administration of not exceeding five years.

Intermediate Survey

At least one Intermediate Survey during the period of validity of the Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk should be carried out. Intermediate surveys should be such as to ensure that the safety equipment, and other equipment, and associated pump and piping systems comply with the applicable provisions of the Code and are in good working order. The surveyor who carries out the survey should endorse the Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk.

Annual Survey

An Annual Survey which covers the same items mentioned for initial survey in order to ensure that they remain in all respect satisfactory for the intended service. The Annual Survey should be endorsed on the Certificate of Fitness.

Additional Survey

After any:

- Important repairs;
- Renewal or modification;
- Serious accident;
- Discovery of deficiency;
- Major alteration.

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[6]Other than those items in respect of which, Cargo Ship Safety Equipment Certificate and Cargo Ship Safety Radiotelegraphy Certificate or Cargo Ship Safety Radiotelephony Certificate are issued.

The Additional Survey should be carried out on board a ship in order to ensure that the ship is safe and seaworthy. This survey can be either general or partial according to the circumstances and discretion of administration.

Additional requirements

The above surveys should be performed with particular attention to:

a. Ship survival capability and location of cargo tanks;
b. Ship arrangements;
c. Cargo containment;
d. Cargo tank vent systems;
e. Electrical installations;
f. Mechanical ventilation in the cargo area;
g. Pump rooms and other enclosed spaces.

5.6.3. Certificate

After an Initial or Periodical Survey of a chemical tanker engaged in international voyages which complies with the relevant requirements of the Code a "Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk" for a period specified by the Administration which should not exceed 5 years should be issued.

The certificate should cease to be valid:

- If the required surveys are not carried out
- Upon transfer of the ship to the flag of another government
- In the case of major alteration without notification of the administration.

5.7. Certificate of Fitness for the Carriage of Liquefied Gases in Bulk (IGC Code)

5.7.1. Certificate

In order to provide an international standard for the safe carriage by sea in bulk of liquefied gases, the Resolution MSC. 5/48 adopted the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code) later on, the provisions of the IGC Code became mandatory by the MSC. 6/48 under the 1974 SOLAS Convention.

The Code however was again amended by Resolution MSC. 30/61. The Code applies to all ships regardless of their size, engaged in carriage of liquefied gases.

An International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk can be issued to a ship complying with the relevant requirements of the Code after the Initial or Periodical (Renewal) Survey. The certificate should be issued for a period of validity of maximum five years.

In the following cases the Certificate ceases to be valid:

1. If the required surveys are not carried out on board;
2. If the ship has under gone major alteration without endorsement on the Certificate;
3. If the ship changes the flag.

5.7.2. Survey and Inspection

The survey of Gas Carriers is including the structure, equipment, fittings, arrangements and materials of the ship other than those cover by related surveys of the following Certificates:

- Cargo Ship Safety Construction Certificate;
- Cargo Ship Safety Equipment Certificate;
- Cargo Ship Safety Radiotelegraphy Certificate;
- Cargo Ship Safety Radiotelephony Certificate.

Similar to chemical tankers, the Gas Carrier are subject to the following surveys:

- Initial Survey
- Periodical (renewal) Survey
- Intermediate Survey
- Mandatory Annual Survey
- Additional Survey

Additional requirements

The following additional arrangements shall be considered when any survey is to be carried out on board:

a. Ship survival capability and location of cargo tanks;
b. Ship arrangement;
c. Cargo containment;
d. Cargo tank vent system;
e. Electrical installations;
f. Mechanical ventilation in the cargo area.

5.8. Special Purpose Ship's Safety Certificate

The Code of Safety for Special Purpose Ships was adopted by IMO by means of the Resolution A.534/13, on 17 November 1983. The code is covering the same topics as SOLAS 74 Convention and provides international standards for safety of special purpose ships.

The code defines the special purpose ships as:
"a mechanically self-propelled ship of not less than 500 gross tonnage which by reason of its functions carries on board more than 12 special personnel including passengers."

According to the Code, Special Purpose ships are including:

1. Ships engaged in research, expeditions and survey;
2. Ships for training of marine personnel;
3. Whale and fish factory ships not engaged in whaling and fishing;
4. Ships processing other living resources of the sea, not engaged in catching;
5. Other ships with design features and modes of operation similar to ships referred to in 1 to 4.

The "special personnel" are not-seamen, not-passenger people who sail on board. These people are expected to be able bodied and have been trained in safety procedures and the handling of the ship's safety appliances. Therefore Special Purpose Ships need not be considered or treated as passenger ships, provided the maximum number of special personnel on board does not exceed 12 persons.

The Code applies to special purpose ships of not less than 500 GT. However, the provisions of the code may be applied as far as reasonable and practicable to special purpose ships of less than 500 GT.

For the purpose of survey and inspection, the special purpose ships are subject to the same surveys as for the cargo ships, other than tankers, specified in the SOLAS 74/78 Convention.

Certificate

After the initial survey, "Special Purpose Ship Safety Certificate" should be issued. The duration of the validity of the Certificate should be according to provisions described for cargo ships in the SOLAS 74/78.

It should be noted that, where such ships are engaged on international voyages, they should, in addition, also carry SOLAS Exemption Certificates if applicable.

5.9. Offshore Supply Vessel's Safety Certificate

The Resolution 469/12 adopted "Guidelines for the Design and Construction of Offshore Supply Vessels" which provide guidelines for the offshore supply vessels between 24 and 100 metres carrying not more than 12 passengers. The requirements of the guidelines are relevant to SOLAS 1974 and IMO Resolutions numbers A.167 and A.206 on Intact Stability.

The Resolution defines the Offshore Supply Vessel as "a vessel:

1. which is primarily engaged in the transport of stores, materials and equipment to offshore installations; and
2. which is designated with accommodation and bridge erections in the forward part of the vessel and an exposed cargo deck in the after part for the handling of cargo at sea."

With due regard to special circumstances and adverse weather condition which these vessels normally encounter, constructional precautions, specially against capsizing, should be considered.

The air-pipes and ventilators, access to superstructure, machinery and hatches should be inspected, particular attention should be given to freeing ports and drainage. Care should be taken to ensure that the vessel maintains the minimum freeboard at all times. More over, operational requirements set forth in the Guidelines and operational precautions during navigation, towing and cargo handling should be observed.

The offshore supply vessels should comply with the provision of the SOLAS 74/78 Convention for cargo ships in respect of machinery and electrical installations, fire protection, life saving appliances and radio communication.

Resolution 673/16 set forth standards which provide an alternative to the International Code for the Construction and Equipment of Ships carrying Dangerous Chemical in Bulk and the International Code for the Construction and Equipment of Ships carrying Liquefied Gases in Bulk.

The guidelines adopted by this resolution apply to those Offshore Supply Vessels who are transporting and handling limited amount of Hazardous and Noxious Liquid Substances in Bulk. These guidelines are regarding the followings items:

1. Stability criteria;
2. Cargo tank location;
3. Design and construction;
4. Pollution requirements;

5. Personnel protection; and
6. Operational requirements.

According to these guidelines, following a satisfactory completion of Initial Survey of an offshore supply vessel, the administration should issue a Certificate.

5.10. Diving System Safety Certificate

The Code of Safety for Diving System was adopted by IMO by Resolution A.536/13 on 17 November 1983.

The Code recommends design criteria and construction, equipment and survey standards for diving systems in order to:

- "Minimise the risk to divers, personnel, ships and floating structures having such systems on board;
- Facilitate the international movement of such ships and floating structure in the context of diving operations."

The Diving System means:

The whole plant and equipment necessary for the conduct of diving operations using transfer under pressure techniques.

The Code is not mandatory and does not cover the diving operations or the procedure for the control of diving operation. It applies to new fixed diving systems which are certified more than 12 months after the adoption of the code.

Certificate

Each diving system is to be provided with a Diving System Safety Certificate. The Certificate shall be issued after a satisfactory inspection, and for maximum duration of five years. The extension of validity may be granted by the administration for a period of maximum five months.

In the following cases the Certificate will cease to be valid:

1. If significant alterations to the system have been made; and
2. If survey and inspection have not been carried out.

The following surveys and inspections are recommended to be carried out by the administration:

- Initial Survey;
- Renewal Survey;
- Annual Survey.

5.11. Construction and Equipment Safety Certificate for Dynamically Supported Craft

5.11.1. The Code

The IMO Resolution A.373/X adopted the "Code of Safety for Dynamically Supported Vessel[7]" on 14 November 1977. The Code is rather comprehensive and covers a wide range of requirements for a vessel. It consists of the requirements for the design and construction of dynamically supported craft, together with requirements for equipment which should be carried on board and the appropriate condition for their operation and maintenance.

A Dynamically Supported Craft is defined as:

"A craft which is operable on or above the water and which has characteristics so different from those of conventional displacement ships, to which the existing International Conventions, particularly the Safety and Load Line conventions, apply, that alternative measures should be used in order to achieve an equivalent level of safety"

The Code applies to craft which:

1. Carry more than 12 passengers but not over 450 passengers with all passengers seated;
2. Do not proceed in the course of their voyage more than 100 nautical miles from a place of refuge;
3. May be provided within the limits of sub-paragraphs (a) and (b) with special category spaces intended to carry motor vehicles with fuel in their tanks.

The code is not mandatory, however many maritime administrations have incorporated it into their national legislation and some others have adopted their own set of standards.

Annex III of the Code contains the interpretation of the COLREG, from which as per the discretion of the administration a craft may be exempted from compliance with any requirement.

5.11.2. The Certificate

The following Certificates are issued after the initial and periodical survey have been carried out:

- Dynamically Supported craft Construction and Equipment Certificate;
- Dynamically Supported Craft permit to Operate.

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[7] Resolution A.373 superseded the: Res. A.126/V, Res. A.170/ES. IV, Res. A.183/VI, Res. A. 218/VII and MSC. Circular number 87.

The period of validity of the Certificates should not be assigned for more than 12 months. Another major aspect in the certificate is the 'Trading Area'. It should be ascertained that the craft is sailing only in the area specified in the Certificate.

The Code requires an initial assessment, periodical survey and intermediate inspections as follows for each craft:

Initial Survey

According to the Code an initial assessment containing:

a. Appraisal of the assumptions made regarding loading, environment, speed and manoeuvrability;
b. An appraisal of data pertaining the safety of design obtained as appropriate from calculations, test and trials;
c. An investigation into the adequacy of the various manuals to be supplied with the craft; and
d. A complete survey of the craft's structure, equipment, fittings, arrangements and materials in so far as the craft is covered by the Code.

Periodical survey:

It should be carried out at intervals not exceeding 12 months. The administration surveyor shall satisfy himself as to suitability of the:

a. Structure;
b. Equipment;
c. Fittings;
d. Arrangements; and
e. Materials,

for the intended service of the craft.

Intermediate Inspection

It is done in order to ensure that the:

- Maintenance instructions; and
- Operating instructions,

required by the Code, are being complied with completely.

The author's Comment

The study on the recent major accidents in which the Dynamically Supported Crafts were involved, shows that there are two main areas, amongst others, which in order to prevent similar accidents, the administration/surveyor and operators should pay particular attention to.

I. Technical

Close inspection of technical details such as, structural integrity, sub-division and damage stability. In addition, the control back-up, or redundancy systems should be checked to be completely independent as well as to be as far as possible fail safe.

The Failure Mode and Effect Analysis (F.M.E.A.), has been found to be a very useful and effective method to make the system to great extent fail safe and consequently to improve the safety. The surveyor should ensure that an F.E.M.A. has been carried out and the effects of failures assessed as required under chapters nine and sixteen of the Code.

II. Operational

The main source of proficiency and knowledge for the crew on board of DSCs, to great extent, is still the experience rather than an integral training course. Obviously with the use of modern technology and advanced control systems on board these craft, the experience alone can not ensure safe and efficient operation of the vessel.

The communication with Base port throughout the voyage which can ensure the continuous back up and assistance from shore, is another factor involved in safe passage of the dynamically supported craft.

The surveyor should pay particular attention to the Operational Requirements set forth in IMO resolution A.742/18 accordingly. He should also ensure the carriage and compliance with the Operation and Maintenance Instructions mentioned in the Code.

5.12. Safety Certificate for Mobile Offshore Drilling Units

5.12.1. Code

The Code for Construction and Equipment of Offshore Drilling Units defines the MODU as:

"A vessel capable of engaging in drilling operations for the exploration or exploitation of resources beneath the sea-bed such as liquid or gaseous hydrocarbons, sulphur or salt."

The Code recommends design criteria, construction standards and other safety measures for MODUs. Due to severe weather conditions and special circumstances in which the Offshore Drilling Units are operating, the suitability of their service must be subject to

complete assessment by an experienced and competent surveyor in order to achieve acceptable standard of safety for the installations and the personnel on board.

Some of the states have adopted their own sets of regulations for inspection and certification. In 1989, IMO adopted Resolution A.649/16, Code for the Construction and Equipment of Offshore Drilling Units 1989, MODU Code 1989.

The MODU Code 1979 does not distinguish between "new" and "old" units, while the 1989 MODU Code applies to new units from 1st of May 1991. However none of them are mandatory.

5.12.2. The Certificate

After assessment and survey of the design and fabrication of the installation during construction, the responsible authority will issue a Certificate of Fitness based on the survey and inspection report if they are satisfactory and found suitable for intended service.

The validity of the Certificate is normally five years, provided the Annual Surveys of the structure and equipment are carried out regularly.

A MODU is subject to:

- Initial Survey;
- Annual Survey;
- Periodical (Renewal Survey).

Nevertheless, if the unit is approved according to SOLAS and LOADLINE Conventions, then the Certificates shall be issued according to these conventions. The Radio Safety Certificate and I.O.P.P. Certificates shall always be issued according to SOLAS and MARPOL conventions respectively.

In Islamic Republic of Iran, this is the responsibility of the Ministry of Oil to take care of Offshore installations, however it is recommended that the safety of MODUs should be taken care of by the Maritime Safety Administration and the drilling operation, by the Ministry of Oil. Based on the fact that a nautical surveyor has obviously adequate knowledge and experience with regard to marine Life Saving Appliances, Marine Evacuation Systems and Fire Fighting Apparatus, he is also supposed to be familiar with special characteristics of marine environment and unusual circumstances which dictate the fortune of the personnel. Therefore he can be the most suitable person to take care of safety on board the MODUs.

Further more, due to the nature of the accidents in which the MODUs are involved and their similarities with maritime accidents and also considering the responsibility of the Maritime Administration to furnish the IMO with details of any maritime casualty[8], the nautical surveyor/investigator under the maritime administration, is obviously the most appropriate person to perform the task of inquiry and investigation.

5.13. Noise Survey Report

The Code on noise levels on board ships, Res. A. 468 is designed in order to limit noise levels and to reduce exposure to noise in order to provide safer working condition. It is aiming to protect the seafarers from excessive noise level and to provide an acceptable degree of comfort in rest for seafarers.

The Report

A Noise Level Report should be made for each ship of 1600 gross tonnage and over and should contain the reading of the noise levels in the various spaces on board and be taken at full sea speed.

This report should be carried on board where the ship is not complying with chapter four (Maximum acceptable sound pressure levels) of the Code.

The Code recommends also that the machinery, equipment and associated working spaces should be regularly inspected with respect to noise, by a competent person and defects (if any) rectified as soon as practicable.

5.14. Convention on International Regulations for Preventing Collision at Sea (COLREG)

5.14.1. The Convention

The requirement of ship's navigation lights (positioning, arrangement and technical details), shapes and sound signal appliances are regulated by the "Convention on the international Regulations for Preventing Collisions at Sea 1972 (COLREG 72). It entered into force on 15.7.1977.

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[8]Chapter one paragraph eight of the 1989 MODU Code states: "Each administration should supply the IMO with pertinent information concerning the findings of investigations of any casualty occurring to any of its units subject to provisions of the Code".

This Convention also lays down the basic rules of the road governing the traffic of ships at sea including rights of the way, safe speed, action to avoid collision, procedures to observe in narrow channels and in restricted visibility and signals to be used to warn about manoeuvres.

The Convention requirements apply to all ships sailing on the high seas and in all waters connected therewith navigable by sea going vessels.

The COLREG 1972 Annex I requires that the construction of lights and shapes shall be to the satisfaction of the appropriate authority of the flag state.

Although the COLREG Convention 1972 does not contain any requirements for survey and inspection, chapter I regulations 7 and 8 of SOLAS 1974 contain provisions in this regard for surveys of passenger ships and cargo ships respectively.

Compliance with technical requirements of COLREG Convention 1972 must be inspected and controlled by the administration surveyor as follows:

5.14.2. Type approval

Type approval and/or individual testing including quality control in some cases, manufacturer may be authorised to certify the products but then the administration shall establish a random inspection system.

Sound signals should be tested and approved according to Annex III of the Convention.

5.14.3. Survey and Inspection

It shall include, as regards lights:

a. Colour and intensity;
b. Horizontal and vertical sectors;
c. Capability to withstand ordinary conditions of the sea;
d. Electrical system and independent switch board;
e. Audio-visual alarm system for each light;
f. Emergency source of power;
g. Spare suitable set of bulbs on board;
h. Arrangements and positioning of lights.

5.14.4. Issuance of the certificate

The certificate requirement is incorporated into the SOLAS Cargo Ship Safety Equipment Certificate and Passenger Ship Safety Certificate.

Recommendation

While the Load Line 1966 Convention and Tonnage 1969 Convention have exempted the ships solely navigating, among others, in Caspian sea from the compliance with the provisions of those conventions, but because of safety concern and with due regard to the following facts that:

- Iran is a country with long coastline on the south coast of Caspian Sea;
- Active ports (Nowshahr and Bandar-anzali) on the coast of Caspian Sea;
- Growing trend of multi-national maritime trade in the mentioned area; and
- Adverse weather condition encountered at the times in the Caspian Sea,

it is recommended that, the Ports and Shipping Organisation, (P.S.O.) enacts detailed rules and regulations for assignment of the load line and for the tonnage measurement of the ships sailing in Caspian Sea.

The above can be achieved more effectively if close co-operation is established with the six classification societies recognised by P.S.O. In addition, it is desirable and in fact necessary for the coastal states namely:

1. Islamic Republic of Iran,
2. Russian Federation,
3. Turkmenistan,
4. Kazakhistan,
5. Azerbaijan,

to adopt a set of uniform rules and standards in this regard. That would be, to the extent possible, in harmony with the mentioned Conventions.

Obviously the above actions will create a platform to support the efforts of the administration and nautical surveyors in discharging national and international obligations of the country, towards safety of life and protection of environment and property.

CHAPTER SIX

Maritime Investigation and Inquiry

6.1. Introduction

Fortunately or unfortunately the occurrence of accidents and investigations following them, have played very important role in promoting the safety at sea and protection of marine environment throughout the history. One can see the accidents such as; Titanic in 1912 ,Tory Canyon in 1968, Amoco Cadiz in 1979, Herald of free Enterprise 1987 and Exxon Valdiz in 1989, the investigation following each of them and related recommendations thereby made, have enlightened some forgotten areas and have caused improvement of safety standards.

Of course it was very unfortunate that the maritime community should "***wait for an accident to happen***" and then learn a lesson from that. Thanks to the Maritime Safety Committee and Maritime Environmental Protection Committee of IMO, which devote a great amount of activity to technical study and research, the accidents nowadays to a much greater extent attempted to be prevented rather than be cured after they happened.

But the number of maritime accidents happening every day, suggests that, there is still much to learn from the previous cases. According to Captain J.de Coverly, F.N.I. Principal Nautical Surveyor, D.O.T. "first and foremost, they (maritime investigations) show whether there are lessons to be learned. Evidently to find out whether there are such lessons we must find the causes of the accident, but this is not the end itself. Secondly, casualty investigations assist in keeping

up professional standards, through their association with disciplinary measures".

6.2. National Legislation

The first step towards the adequate and effective maritime investigation system and achievement of its goals and objectives is to enact proper national legislation, because the source of legal authority for inquiry and investigation has to be the national legislation. In this regard the government should enact legislation as to:

- Define the casualty;
- Define the circumstances in which the inquiry/investigation should take place;
- Prescribe the procedures, making reports, forms and so on;
- Prescribe the nature, extent of investigation and who may conduct it;
- Prescribe the extent of duties, powers and responsibility of all persons in charge of such a matter.

The investigation might be defined in the national legislation as, when one or more of the following accidents happened:

1. The loss or presumed loss, stranding, grounding, abandonment of or damage to a ship;
2. A loss of life caused by fire on board or by any other accident to a ship, or any accident occurring onboard a ship or ship's boat; or
3. Any damage caused by a ship(D.O.T.).

6.3. International Legislation

International obligations of the states with regard to Casualty Investigation, are covered by the following treaties:

- United Nations Convention on the Law of the Sea 1982, art. 94;
- SOLAS Convention 1974, chapter I Regulation 21;
- Load Line Convention 1966 article 23;
- ILO Minimum Standards Convention 1976 (No.147), art 2;
- MARPOL Convention 73/78, article 12.

According to the Law of the Sea Convention 1982, Article 94 (7), each state is required to initiate an inquiry to be held into marine casualties involving a ship flying its flag. Also article 223, directs the states to conduct the inquiries to facilitate witnesses and evidence provided by other states or international organisations and also should

facilitate the attendance of official representatives of any state affected by the pollution due to any violation.

Generally, according to the IMO Conventions each contracting government undertakes to supply IMO with pertinent information concerning the findings of maritime investigations. The following are the major topics to consider:

1. Regulation I/21 SOLAS 74 requires each administration to undertake the conducting of an investigation of any casualty occurring to any of its ships when it judges that such an investigation may assist in determining what changes in the present regulations of SOLAS might be desirable.

2. International Convention on Load Lines 1966, in article 23 directs the administration to conduct an investigation when such an investigation may assist in improving the Convention.

3. The IMO Resolutions A.173/ES.IV concerning participation of official inquiries into maritime casualties suggests that countries with substantial interest in maritime casualties are permitted to be represented at the inquiries, and to encourage international unified investigation practices.

4. Resolution A.322, the conduct of investigations into casualty, draws the attention of contracting governments to their obligations to investigate casualties as stated in the Convention and to supply IMO with information about the lessons to be learned and the conclusions.

5. Resolution A.440/XI adopted in order to provide guidelines pertaining exchange of information for investigations into marine casualties and more over the Resolution 637/16 emphasis on the need for both full co-operation between states in the conduct of investigations and the exchange of information regarding investigations, so that the purpose of such investigations may fully be realised.

6.4. Goals and objectives of Investigation

Goals and objectives of accident investigations can be expressed as follow:

1. Protection of people from death and injury;
2. Protection of the environment;
3. Protection of economical and commercial resources;
4. Raise the public's confidence in the transportation system;
5. Improve the safety standards;
6. Assessment, review and improvement of rescue services;
7. Evaluation of present international or national regulations and if necessary propose amendments to the existing regulations.

6.5. Purpose of Investigation

The investigating officer's paramount aim must always be to gather the relevant facts including all necessary evidence to establish the cause of a casualty. In detail he should aim towards ascertaining the following with reasonable degree of accuracy, which are counted as the main purposes of investigation:

1. Determine as precisely as possible the cause or causes of casualty in order to take measures to prevent them;
2. If loss of life or injury occurred and how it was caused;
3. Any defect in the hull, machinery and equipment which may have led to the casualty;
4. The ship's standard of stability;
5. If pollution occurred, extent, nature and the cause of incident;
6. Adequacy and functioning of the safety appliances;
7. The operation and efficiency of radio and navigational aids on board;
8. The nature of damage to the ship;
9. The prevailing weather condition at the time of accident;
10. The state of cargo, how it had been loaded, whether the ship has been over loaded;
11. Whether relevant statuary requirements had been complied with;
12. The cause or probable cause of the casualty;
13. Rescue services rendered by other ships or other survivors.

6.6. Type of Inquiry

Depending on the seriousness of accident or incident the type of enquiry may differ and the administration may exempt the case from any investigation. In those cases a report from the master and owner,

and in more serious cases a report from the surveyor and declaration of the facts can be sufficient. If the administration so desires to hold an investigation due to various reasons, it can be in two types as follows:

1. In the case of serious accidents, a **Preliminary Investigation**; and,
2. When a major disaster happens, a **Formal Investigation** would be required.

6.7. Preliminary Investigation

The Preliminary Investigation is held in order to establish the cause of casualty, all the available evidence is obtained. This would also form the basis on which the administration may determine whether or not a formal investigation is necessary.

The procedure for holding Preliminary Investigation, by the investigator/surveyor is as follows:

1. Receiving information and/or report;
2. Receiving the Letter of Appointment for the case;
3. Proceeding to the scene of the casualty, if appropriate;
   - to go on board and inspect; and
   - to go and enter any premises, he founds necessary,
4. Taking the statements;
5. Obtaining evidences such as:
   - Log Books, nautical charts
   - Traces
   - Photographs
   - Statement from third party
6. Administering the oath (according to the case, if defined by the law);
7. Submitting the proceedings and reports of preliminary investigation;
8. Making an application for a Formal Investigation.

After the investigating officer has ensured that the issues mentioned earlier are properly and completely investigated and the procedure above has been followed, he should prepare the Investigation Report as follows:

6.8. The Preliminary Investigation Report

The importance of the Report can not be over emphasised, as the P.I. Report would be treated as the basis for the following decisions and actions and should be carefully prepared. It shall comprise of the following items:

6.8.1. Summary, containing following in brief:

a. sequence of events;
b. investigator's conclusion;
c. recommendation.

6.8.2. Factual report containing:

a. Information about background of ship, crew and equipment;
b. Events leading to casualty;
c. Events that followed the casualty (including Search and Rescue);
d. Other relevant circumstances and events.

6.8.3. Investigator's comments, which normally consists of three parts:

a. Narrative;
b. Conclusions and opinion;
c. Recommendation,

In detail the investigator should discuss the following items in his comments:

a. reliability of the witnesses and other evidence;
b. breaches of standards;
c. discussion on the sequence of events;
d. execution of emergency procedures;
e. search and rescue;
f. cause of casualty;
g. measures which might have prevented the casualty;
h. recommendation as to Formal investigation and or other actions;
i. recommendation for action to be taken against the officers' certificates;

6.8.4. Finally, the investigator should enclose the appendices. He shall feel free to put whatever he thinks is relative, as the appendices. In addition, the following are considered to be necessary:

i. Declarations;
ii. Plans of ship and its equipment;

iii. Relevant statuary certificates;
iv. charts; and Logs extracts;
v. Crew and passenger list;
vii. Cargo details;
viii. Search and Rescue reports;
ix. Weather reports;
x. Transcripts of distress traffic;
xi. Press cuttings and photographs;
xii. Other items at the inspector's discretion(D.O.T.).

It is very important that, the investigator's opinions, conclusions and recommendations be clearly marked and/or be separated from the factual texts in the report. This will avoid any confusion and misunderstanding during the inquiry process.

6.9. Formal Investigation

As stated before, if the investigating officer carrying out the Preliminary Investigation, decides that it is necessary, he may recommend to the administration to hold a Formal Investigation. The Formal Investigation usually takes the form of a court of investigation. The court should be an independent and unbiased body. The Formal Investigation is normally held by the order of the government or head of maritime administration in any of the following circumstances:

1. If the Preliminary Inquiry is not considered sufficient;
2. If it appears that the case occurred by an avoidable cause;
3. If it appears it will lead to prevention of similar casualty;
4. If the casualty was accompanied by loss of life or property;
5. If the casualty has given rise to public attention;
6. If there has been alleged default or negligence from the side of crew or others;
7. If a certificate of competency of an officer is likely to be dealt with.

6.10. Guidelines

The investigator's qualification may vary within the wide range of backgrounds but the most preferable one is professional ship master or chief engineer. The main factor governing the quality of the work is the experience of the investigator, both as a seafarer and as an investigator.

Therefore though the training courses and guidelines are playing an important role in efficiency of the Investigator, but, the ability to put together the:

- Common sense;
- Physical evidences; and
- Prevailing standards,

definitely demands a broad maritime knowledge and experience which in the author's opinion, only an ex-seafarer can provide.

During the investigation, failure to comply with statutory requirements as listed below may come to light; therefore, the investigating officer should always be on the look out for:

- Lack of, or incorrect, statutory Certificates;
- The absence of equipment or nautical publications;
- Poor maintenance of the fittings, equipment or appliances;
- Contravention of the Collision Regulations;
- Ship over-loaded or improper stowage;
- Requisite drills not held;
- Misconduct, including illegal addictions and so on;

The investigator may include, the facts and apparent breaches of the rules in separate report and may submit it earlier than the report of Preliminary Investigation.

The following details are about five major types of maritime accidents, regarding which administration investigator may be called upon to carry out Preliminary Investigation:

6.10.1. Collision Investigation

A. In the case of collision, two primary actions, should take place as soon as possible:

1. Interview with master and crew to obtain the description of the incidents; and
2. Collecting the factual information and evidences.

B. Following facts are to be collected while on board:

1. Navigation history:

a. Fixes or observations, visually taken or by Radar or other Nav. Aids systems;
b. Distance and bearing of other vessel and angle of collision;
c. The mode of Communication (whistle, VHF, etc.);
d. Manoeuvres (from orders to actions, all the process to be verified);
e. Environmental condition (Sea state, weather condition and state of visibility).

2. Data and facts:
a. Gyro error, Deviation, Variation;
b. Manoeuvring data;
c. Engine, propeller and rudder performance and characteristics; and
d. Verification of time among all the control stations.

C. The investigator should preserve the evidences such as; navigational charts, radar plotting sheets, course recorder and Log Books. In addition also, he should take some photographs which to the extent possible create a picture of the event, to the benefit of those who had not been on the scene. Thereafter, the investigator should attempt to re-construct the situation that led to the accident, keeping in mind the inaccuracies in each evidence and particularly recording of the times.

The analysis should then be compared with the testimonies of those involved and conclusion should then be drawn.

6.10.2. Fire and Explosion

A. In the case of fire the following should be considered:

1. Ignition source including:
- Sample test of ashes near origin;
- Crew activities;
- Difficulties in eliminating ignition source.

2. Combustible supporting the fire and chart spread of fire and contribution of electric cables.

3. The adequacy of:
- Smoke and fire detectors, fire patrol and alarm system;
- Fire and water tight doors, fire dampers in ventilation systems and vent shut-off switches;
- Structural fire insulation of bulkheads and decks and fire zones.

4. Effectiveness of fire fighting operation:
- CO2, water, foam;
- The function and co-operation of the crew and fire brigade;
- Commanding the operation;
- Fire fighting techniques.

5. Smoke and heat problems, inter alia:
   - Difficulties encountered to contain the fire and smoke in the boundaries; and
   - The effect of fire and smoke on the operation and on the ship.

6. Weather condition with particular attention to the wind direction and wind speed.

B. And in the case of investigation of explosion on board tankers:

1. Characteristics of cargo on board, flammability limits, compatibility, flash points, vapour pressure, LFL, LUL[1] and composition should be verified. Further more the temperature of the cargo and also the type of previous cargo carried should be noted.

2. Closure and maintenance of tanks and piping systems, vent systems (including observation of the Pressure/Vacuum Valves and Lightning arresters) gauging system and ullage screens should be assessed and physically examined. Moreover the Steam piping, Inert Gas System, Crude Oil Washing and ballast system are also to be examined.

3. Ignition sources such as electrostatic discharges during tank cleaning, loading and unloading, venting by air blowers and steam jets should be suspected.

4. Ignition sequence as:
   - Structural deformations, deck curling caused by internal explosions;
   - Weld tears due to pressure;
   - Debris pattern and debris layering;
   - Tank atmospheres.

6.10.3. Capsizing

The Investigator should generally consider the righting forces against inclining forces with due regard to stability condition. In this respect he should attempt to collect the following facts:

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[1]Lower Flammable Limit

1. Loading of each compartment, considering: specific gravity, viscosity, free surface, stowage factor and suspended weights;
2. Condition of valves which are connecting compartments;
3. Water on deck, scuppers and storm valves;
4. Inclining experiment, loading booklet;
5. Alteration to hull and machinery;
6. State of the sea and prevailing weather condition (wind as a factor).

The next step would be to determine the location of centre of gravity, GM, and wind loads with regard to the ship's heading.

6.10.4. Grounding

In the case of grounding, as the first step the investigator should gather the following:

1. Statement and/or interview with all involved persons;
2. Navigation details using chart fixes, set and drift, echo sounder readings and course recorder;
3. State of navigation equipment such as Radar, course recorder and echo sounder;
4. Deviation table, Compass Error and Gyro Error;
5. Bank cushion, shear and squat;
6. Ship to ship interaction;
7. Helmsman back ground and experience, his knowledge of English or the language in which he was receiving orders from the Master, Pilot or Officer on watch.

6.10.5. Disappearances

Occasionally the maritime world witnesses disappearances of ships, some times strangely, they have happened without any traces left. However the following information can pave the way to reach to the facts regarding those accidents and hopefully prevent them from happening again:

1. Detailed history of crew's experiences, training, health and competence;
2. Detailed history of hull maintenance and inspection prior to accident;
3. Information from previous reports of deficiencies and malfunctions particularly regarding the hull;

4. Cargo data, including quality of stowage, density, stowage factor and the possibility of shifting;
5. Stability information;
6. Inspection of any sister ship in order to determine comparable condition of hull;
7. Weather and state of the sea in the area, size of the waves;
8. Radio messages of relevance, received or over heard, both official and private, prior to the accident.

6.11. Recommendation

Safety enhanced through spreading of knowledge and experience.

In order to further improve the methods and procedures used in Maritime Casualty Investigation in I.R.Iran, it is recommended to establish a comprehensive training programme for the maritime investigators.

Further, in order to promote the knowledge and experience gained by, namely:

- The P.S.O.;
- The I.R.IRAN Navy;
- The coast guard; and
- The governmental Iranian shipping companies[2],

who devoted their efforts to the safety of seafarers and maintaining the flow of maritime trade in the Persian Gulf during the Imposed War[3], it is recommended that a joint effort be made in this respect. The above may be achieved through seminars to share and transfer the information, knowledge and experience gained.

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[2] Over all fleet of nearly eight million ton dwt

[3] Between 1980-1988 when Iraqi jet fighters attacked merchant shipping and oil platforms in Persian Gulf

CHAPTER SEVEN

PORT STATE CONTROL

7.1 Introduction

Safe ships do not just happen (Onstad 60). They are the result of not only good design, construction and maintenance practices but also of good operating policies and procedures. Further more they remain safe not by the chance, but by means of close supervision and application of efficient control mechanism.

Dissimilarly, the unsafe and sub-standard ships are not only the sign of poor maintenance but also they are the result of inadequate supervision. The responsibility for the sub-standard ships rests mainly with:

1. The flag state which has the primary responsibility for the effective implementation of the international standards;
2. The ship owner who must ensure the safe and seaworthiness condition of his ship;
3. The master of the ship and each member of crew;
4. The port state;
5. International organisation such as IMO and ILO to certain extent.

As above, the Port State Control is the final stage in the effort to be made to diminish or decrease the number of sub-standard ships. The Port State Control by no means must be interpreted as a substitute to the Flag State Control. Mr. F. Plaza defined it as "the last safety net, when the parties involved have, in one way or the other, failed to do their job".

In this regard, according Mr. S. Boden[1]:

"It is a fact that the ultimate responsibility for a ship's compliance with internationally agreed safety and environmental standards primarily rests upon the owner, the master and the flag state. The reason for Port State Control is that certain flag states for various reasons fail to fulfil their commitments under internationally agreed instruments.". However it can be defined as a mechanism for ensuring that the standards set forth in the various IMO conventions are maintained.

The concept of P.S.C. has been laid down in the number of conventions such as:

- SOLAS Convention ;
- MARPOL Convention;
- STCW Convention.

In addition, there are other relevant instruments normally included in Port State Control such as:

- COLREG Convention;
- Load Line Convention;
- ILO Convention 147.

7.2. Definitions

There are three key terms which are widely used and are differently interpreted on the issue of PSC. It seems necessary to define and understand them. They are, namely:

- Seaworthiness
- Sub-standard
- Clear grounds

7.2.1. Seaworthiness

The ship is said to be seaworthy if she shall be capable of combating and enduring the ordinary perils of the sea on the intended voyage without prejudicing the safety of crew, ship and property.

7.2.2. Sub-standard ship

A ship is sub-standard if its hull, machinery or equipment such as life saving appliances, radio, fire-fighting apparatus and pollution

[1]Mr. Staffan Boden, Head of Division, Swedish Maritime Authority.

prevention equipment are below the standards required by the relevant conventions, owing to;

1. The absence of equipment or arrangement required by the convention;
2. Non-compliance of equipment or arrangements with relevant specifications of the conventions;
3. Substantial deterioration of the ship or its equipment because of, for example, poor maintenance; and
4. Lack of valid certificates which can be interpreted, prima facie, as non-compliance with the related national and international enactments.

The examples of sub-standard ships are numerous, but the following cases can demonstrate the concept of sub-standard ship and the extent of the treat they might impose on the safety of life at sea and environment:

- Emergency fire pump inoperative,
- Launching of life boats not possible due to rust and or accumulation of paint, and failure to carry out regular drills,
- A ship without accommodation heating system in a cold climate.

Finally it is relevant to name the reasons for sub-standard ships as follow:

1. Old age of the ship;
2. Lack of operational control by the ship owner;
3. Lack of adequate training for officers and/or crew;
4. Lack of sufficient supervision by the flag state control.

7.2.3. Clear grounds

In the concept of Port state Control the "clear grounds" as a requisite for in-depth inspection of the ship may be:

1. A report or a notification by another authority;
2. A report or a complaint by the master, crew member or any person with a legitimate interest in the safe operation of the ship, shipboard working and living conditions or the prevention of pollution unless the authority concerned deems the report or complaint to be unfounded;
3. Other indications of serious deficiencies such as lack of valid certificates etc.

7.3. Responsibility of the port state

In order for a state to carry out its obligation under Port State Control it should proceed with the following:

1. Ratify relevant instruments;
2. Incorporate the instruments in the national legislation;
3. Institute a "ships inspection authority" which can execute the practical side of the PSC;
4. Empower the "inspection authority" to take necessary measures (e.g. detention of the ships).

Under the marine pollution prevention conventions there are three areas in which Coastal State or Port State Control is envisaged:

- Control of discharge violations;
- In-port inspection of crude oil washing procedures;
- Control procedures under Annex II of the Convention, related to harmful liquid substances.

7.4. N.M.F.T. Clause

A non-party flag state means a country which has not ratified the relevant convention. The ships of these states are not holding the relevant certificates. Nevertheless, according to N.M.F.T. Clause (No More Favourable Treatment Clause) they are not exempted from compliance with requirements of the Conventions and have to comply accordingly. These ships are also subject to survey and inspection when visiting the ports of a party to the convention. For the sake of convenience, instead of the concerned certificate, the relevant authorities are issuing a "letter of compliance".

The port state control is generally executed in a frame work based on regional agreement. The Paris Memorandum of Understanding on Port State Control (among 15 European countries) is an example. According to such an agreement the member states are obliged to live up to some agreed commitments. As a matter of suggestion hereunder, they are enumerated[2]:

- Each authority will give effect to the provisions of the Memorandum and its annexes;
- Each authority will maintain an effective system of port state control to ensure that foreign merchant ships visiting its ports

[2]Paris Memorandum of Understanding on Port State Control, 1982.

comply with the standards laid down in the relevant international conventions and all amendments thereto in force.

- There will be no discrimination as to flag.
- Each country will have to achieve an annual total of inspections corresponding to 25% of the estimated number of individual ships which entered the ports of its State during a twelve months period.
- Each authority will consult, co-operate and exchange information with the other authorities in order to further the aims of the MOU.
- In case the relevant conventions do not contain requirements for small ships (non-convention ships), the authorities should be guided by any certificate or document issued by the flag state, and will take such action as may be necessary to ensure that those ships are not clearly hazardous to safety, health or the environment.

7.5. Inspection procedures

In general, inspection is defined as verifying the required certificates and documents. The inspection consists of a visit on board a ship in order to check the certificates and documents which are relevant for the purpose of a port state control. If the documents appear to be valid and the surveyor's general impression is that the ship is in good order he will conclude his inspection at that point with a so called "clean report".

However the surveyor should use his professional knowledge to make a rough assessment of the ship, namely, from the appearance of the ship in the water, an impression of its standard of maintenance from items such as; the condition of its paint work, corrosion or pitting and un-repaired damage, before he boards the ship.

The surveyors who carry out the inspections in accordance with the Port State Control regulations must be properly qualified officials. They should have at least some years experience of Flag State Control as a necessary background.

An efficient communication system and a computer data base among the member states are vital means for sharing and using information. Without them the success of the mission can be under question. The computer data base forms the nerve centre of the system which shall be continuously updated. Before inspection the surveyor consults the computer file. He can obtain various information about the ship and her history such as previous inspections, deficiencies and detentions (if any).

If, however, the required certificates are not on board or not valid, or if there are clear grounds for believing that the ship does not substantially meet the requirements of the relevant conventions, a more detailed inspection will be carried out.

During the inspection the surveyor shall verify that the ship is in conformity with the technical standards, inter alia:

- Safety equipment;
- Operational safety;
- Hull and machinery;
- Living and working conditions.

When carrying out controls under the provisions stated in SOLAS 74/78, LoadLine 66 and MARPOL 73/78 Conventions, the flag states are to be informed.

7.6. Detailed inspection

Resolution A.466/12 states that, if however the surveyor from his general impressions or observations on board has clear grounds for believing that the ship might be sub-standard he should proceed to a more detailed inspection.

The level at which the inspection should be carried out is left to discretion of the surveyor. In milder cases he might limit the inspection to the major items as follows:

1. Log Books and Record Books;
2. Life Saving appliances;
3. Fire Fighting Apparatus;
4. Muster list;
5. Communication;
6. Fire and Abandon ship drills;
7. Damage Control Plan (passenger ships);
8. Fire Control Plan;
9. Bridge operation;
10. Cargo operation;
11. Operation of machinery;
12. Training and Maintenance Manuals and instructions.

7.7. Operational requirements

In order to ensure that the personnel are competent enough to carry out vital safety measures and actions, the inspector should satisfy himself that the crew are able to carry out proper life-boat, fire-fighting and abandon ship drills. Nearly 80% of accidents are said to be due to sub-standard actions and 20% due to sub-standard conditions.

IMO Resolution A.742/18 (Procedures for the Control of Operation Requirements Related to the Safety of Ships and Pollution Prevention) defines the "clear ground" from the point of view of operational requirement as follows:

1. Evidence of operational shortcomings revealed during port state control procedures in SOLAS 1974, MARPOL 73/78 and STCW 1978;
2. Evidence of cargo and other operations not being conducted safely or in accordance with IMO conventions and guidelines;
3. Involvement of the ship in incidents due to failure to comply with operational requirements;
4. Evidence, from observation of a fire and abandon ship drill, that the crew are not familiar with essential procedures;
5. Absence of an up-to-date muster list;
6. Indications that key crew members may not be able to communicate with each other or with other persons on board.

7.8. Detention of a ship

The detention of the ship is a very delicate matter. Undue delay or detention may lead to legal action for the compensation of loss or damage by the ship owner.

The important point in this regard is that, the judgement as to whether the severity of the factors (as deficiency) mentioned earlier, make the ship sub-standard and unseaworthy is left to the professional judgement of the surveyor. This brings the author to two points as follows:

A. The Surveyor must be highly qualified and adequately experienced; and
B. The vital decision of detention of the ship should be made with great caution and obviously not by one person alone.

Before considering to confer the detention power to an individual in the national legislation, various factors should be considered, inter alia:

1. The national law;
2. The national and regional situation;
3. The structure of the administration;
4. The experience and knowledge of surveyors who are to be involved in the Port State Control.

Without criticising any system or method being used in some places of the world, the author is of the humble belief that the detaining power should not be conferred upon the inspecting officer in his country. Detention of the ship must take place only if adequate discussions and consideration have taken place in the division. The head of division, may consider to detain the ship having in mind the following factors:

1. The length and nature of the intended voyage or service;
2. Whether or not the deficiency poses a danger to ship, persons on board or the environment;
3. Whether or not appropriate rest periods of the crew is maintained;
4. The size and type of ship and equipment provided;
5. The nature of cargo.

When it is decided to detain a ship, the port state should notify the maritime, consular or diplomatic representative of the flag state in the area. Moreover the list of deficiencies should be forwarded to IMO as well as flag state. If the ship has been allowed to sail off in order to proceed to the next port for repair, then the following should be informed:

i. The country of next port of call;
ii. The flag state;
iii. The relevant classification society;
iv. IMO.

CHAPTER EIGHT

Training Scheme

8.1. Introduction

In order to man the maritime safety administration with the qualified personnel, among others, with the nautical surveyors, it is strongly recommended to establish a short term course in which the necessary knowledge and experience can be imparted to the candidates.

Due to the following reasons the duration for the course is not proposed in this paper:

a. It is the first attempt of its kind in I.R.IRAN, therefore so many other factors should be considered by the Administration before attempting to create a training programme.
b. Wide range of personnel with different background, education and experience are engaged in survey and inspection of the ships, and the details of courses should be accordingly created.
c. The availability of the suitable personnel for attending the course is impossible to predict, since they are presently engaged in various duties in the administration. It should be first decided that for how long and in which manner they can attend the training course.
d. The exact place of performing the training course is not certain yet. Since there is a considerable difference regarding training facilities in the southern ports of the country and those of the headquarters.

e. While there are a number of WMU graduates in the country, there is still the shortage of lecturers and trainers in maritime field, because they are pre-occupied with other priorities. This can be a contributory factor affecting the execution of the course to a great deal.

However co-operation of the WMU graduates with professionals from maritime colleges and institutes in this respect can provide adequate expertise as well as infrastructure for this matter.

Any decision regarding the length and extent of the training course should be made after consideration of the above mentioned facts. In other words the scheme can be changed and/or modified having in mind the prevailing circumstances and conditions. The duration has then to be developed into the course syllabuses.

The following scheme is presented, wishing to assist the Administration to create such a course.

The training scheme comprises of five parts, namely:

- Organisations
- Legislation
- Lectures and theory
- Technical training
- Practical training and field trip.

Part One: Maritime Organisations

1.1. Topic One: National Maritime Administration

The following departments and divisions shall be visited for orientation and familiarisation. The head of each department should be informed about the aim and objectives of these activities in advance to make necessary arrangements. If possible the trainees should be given the opportunity to participate in normal work of the office.

Sub-Topics:

1. Training and International Relations Department;
2. Finance and Personnel Department;
3. Technical Department;
4. Safety and Maritime Services Division;
5. Marine Affairs Division;
6. Registration Division;
7. Port Operation Division;

Part One: Maritime Organisations

1.2. Topic Two: Other National Organisations

There are a number of the governmental and probably non-governmental organisations, which, in the range of their activities, cover certain aspects of maritime affairs. The nautical surveyor should be aware of their existence and their activities.

Sub-Topics:

1. The activities of other authorities related to maritime affairs (any agreement or co-operation);

2. Relevant maritime provisions of:
   i. Ministry of Labour
   ii. Environment Agency
   iii. Ministry of Oil
   iv. Iranian Navy and Coast guard[1]
   v. Municipalities at city ports

3. Familiarisation with regional agreements (e.g. Port State Control) and/or regional co-operation with other neighbouring countries in respect of maritime affairs;

4. Familiarisation with any institute which performs any activity relevant to the type approval or survey of ships and its equipment (e.g. classification society).

[1] The relevant and unclassified civil merchant navy provisions

Part One: Maritime Organisations

1.3. Topic Three: International Maritime Bodies

Sub-topics

1. Familiarisation with the United Nations system

2. Familiarisation with International Maritime Organisation and its unique role in safety of life at sea and protection of the marine environment;
    i. Structure of IMO
    ii. Organs (committees)
    iii. Basis of work of IMO

3. Familiarisation with International Labour Organisation and relevant ILO Conventions (e.g. Minimum standards, 147)

4. Classification Societies:
    i. Purpose and objectives
    ii. The history of the Societies
    iii. Organisation and Structure
    iv. Co-operation and delegation of the tasks to the classification societies
    v. IACS, (International Association of Classification Societies)
    vi. The work of classification societies on:
        a. Plan approval
        b. Type approval
        c. Inspection of ships and off shore installations
        d. Participating in survey

During the training references should be made to:

1. Chapters two and seven of this paper;

2. The Iranian Maritime Code, 1964;

3. IMO resolution A.739/18, Guidelines for the authorisation of organisations acting on behalf of the administration;

Part Two: Maritime Legislation

2.1.1. Topic One: *National Legislation*

The course should be in such a way to furnish the surveyors as a government officer with necessary knowledge in maritime affairs.

Sub-topics:

1. The basis of the work of administration
2. Laws and Regulations
3. The relationship between laws and decrees
4. Technical decrees and departmental Guidelines
5. Notices from Administration
6. Information about Surveyors Instructions and Circular letters
7. Knowledge of procedures for performing accident investigation
8. Legislation and administration's regulations relevant to:
    i. Various ships (including non-convention ships)
    ii. Ship's hospital and dispensary
    iii. Means of access, gang ways and ramps
    iv. Pilot ladders and pilot hoist
    v. Car deck and hanging deck (instruction and signs)
    vi. Passenger accommodation
9. Receive hearings from the parties to a specific case and the public access to specific files
10. Answering enquiries from the Ministries/Minister, if applicable
11. Various specific cases as regards the legislation:
    i. Procedures and instructions for ships transferred from foreign flags

ii. Surveys and inspections

iii. Certification process (according to national and international rules)

iv. Trading Permits, (issuance and validity)

v. Establishment of the number of passengers to be carried

vi. Technical decrees on safety standards of certain ships.

vii. Register of seafarers and issuance of Seaman's Book(Continuous Discharge Certificate, C.D.C.)

viii. Data base of Information (seafarers files)

Part Two: Maritime Legislation

1.2.2. Topic Two: *International Legislation*

Sub-topics:

1. The drafting, adoption and entering into force of International conventions
2. International Conventions, protocols and resolutions
3. Familiarisation with SOLAS 60, 74/78 and MARPOL 73/78 Conventions and their amendments
4. Familiarisation with various IMO Codes such as IGC, IBC, BCH, MODU
5. Familiarisation with Dangerous goods and related publication
6. Familiarisation with the "Guidelines for surveyor" produced by IMO
7. Harmonised System of Survey and Certification

During the training reference should be made to:

1. Chapters two, three, four, five, six and seven of this paper
2. The Iranian Maritime Code, 1964
3. SOLAS Convention 1974/78 as amended
4. MARPOL Convention 1973/78 as amended
5. The BCH, IBC, IGC and MODU Codes
6. Tonnage Convention, 1969
7. Load Line Convention, 1966
8. STCW convention, 1974
9. FAL Convention, 1965
10. Convention on the High Seas, 1958
11. United Nations Convention on the Law of the Sea, 1982
12. United Nations Convention on Conditions for Registration of Ships, 1986
13. IMO Resolution 746/18, Survey guidelines under harmonised system of survey and certification

Part Three: Lectures (theory)

3.1. Topic One: *Stability, Tonnage and LoadLine*

Sub-topics: (Introductory)

Based on the academic background and knowledge of the candidates, the following subjects should be covered, before the professional topics:

- Mathematics (review with respect to maritime application);
- Maritime oriented physics (review);
- Maritime oriented Fluid dynamics (review);
- Application of computer on board ships

Sub-topics: (Main)

.1. Stability:

i. Displacement and buoyancy
ii. Statical stability
iii. Initial stability
iv. List and Trim
v. Inclining experiment and rolling period test.
vi. Stability calculations
vii. Relevant curves, tables and data

.2. Tonnage measurement:

i. Calculation of volumes;
ii. Determination of Gross Tonnage;
iii. Determination of Net Tonnage;
iv. Change of Net Tonnage;
v. Exemption and deductions;
vi. Calculation methods and accuracy;
vii. Presentation of the calculation process;
viii. Practical measurement.

.3. Load Lines and water integrity of the ship;

.4. Orientation to the carriage of grain and angle of repose;

.5. Orientation to the methods of trimming and preventing the grain cargo to shift,

.6. Familiarisation with ballasting and drainage systems;

.7. Orientation to the carriage of Timber deck cargo;

.8. Familiarisation with carriage of solid bulk cargoes and liquefaction problems.

During the training reference should be made to:

1. Of this paper:
   i. Chapter three, sections; 3.2.2., 3.2.4., 3.2.6, 3.2.7.
   ii. Chapter five, sections; 5.4.2, 5.4.3., 5.4.6., 5.4.7.

2. International Regulations for Tonnage Measurement of 1947

3. International Convention on Tonnage Measurement of Ships, 1969

4. International Load Line Convention 1966/1988

5. Ship Stability for Masters and Mates, D.R.Derret

6. IMO Resolution A.749/18, Code on Intact Stability for all types of ships covered by IMO

Part Three: Lectures (theory)

3.2. Topic Two: *Construction*

Sub-topics I:

1. Effect of forces on the structure:
   i. Hogging and Sagging
   ii. Sheer forces and bending moments
2. Subdivision and stability
3. Subdivision and damage stability
4. Structural failure and damage
   i. Causes
   ii. Methods
5. Watertight doors and bulkheads
6. Hull condition assessment
7. Thickness measurement methods and instruments
8. Fire protection measures
   i. Structural Fire safety general measures;
   ii. Fire doors and fire resisting division;
   iii. Fire protection in machinery space;
9. Means of going astern;
10. Manoeuvring information
11. Ventilation System;
12. Emergency source of electrical power;
13. Precaution against shock, and hazards of electrical origin;
14. Bilge pumping arrangements;
15. Cathodic protection system and zinc protectors
16. Outlets, inlets and bottom valves
17. Inspection of the out side of the hull and ships bottom
18. Additional requirements for Ro-Ro spaces

Sub-topics II:

1. Initial Survey
2. Annual Survey
3. Intermediate Survey
4. Renewal Survey
5. Additional Survey
1. Harmonized sys. of survey & certification.

Part Three: Lectures (theory)

3.3. Topic Three: *Investigation*

Proficiency in investigation needs rather years of experience both on board the ship as a seafarers, and work as an investigator, than simply taking a course. Nevertheless the following items can positively contribute in the future performance of the candidates.

Sub-topics:

1. Pathology of maritime incidents
2. Photography
3. Maritime Law
4. Interview techniques
5. Consideration of cases
6. New rules issued in connection with casualty inquiries
7. Participating in casualty investigation survey
8. Statistic on casualties

3.2.2. Suggested Scheme[2]:

3.2.2.1. International Obligations

.1. Conventions and protocols
.2. Convention provisions touching on accident investigation
.3. Resolutions and circulars

3.2.2.2. Investigative Purposes and Procedures

.1. Purposes and types of investigation
.2. Initiation of investigation
.3. Documentary evidence
.4. Physical evidence
.5. Examination of witnesses
.6. Records of testimony
.7. Liaison with other authorities

3.2.2.3. Analysis of evidence

.1. General aspects
.2. Technical aspects
.3. Human aspects

[2] IMO Model Course 3.11, Marine Accident and Incident Investigation

.4. Determination of sequence of events and causal factors

3.2.2.4. Inquiry Reports

.1. Content of reports
.2. Attachment of documentary evidence

3.2.2.5. Administration of Investigations

.1. Enabling legislation
.2. Appointment of investigators
.3. Guidance to investigators
.4. Informal inquiries
.5. Preliminary inquiries
.6. Formal hearing
.7. The investigator's administrative role at formal hearings
.8. The investigator's advisory role at formal hearings
.9. Appearances at a formal hearing
.10. Co-operation with other states
.11. Costs of inquiries and hearings

3.2.2.6.Findings and Recommendations

.1. Recommendations on standards
.2. Recommendations on research
.3. Dissemination of information
.4. Implications of investigation results
.5. Submissions to IMO

3.2.2.7. Group Activity Case Studies

.1. Collisions
.2. Capsizings
.3. Groundings
.4. Fire Casualties

During the training the reference should be made to:

1. Chapter six of this paper
2. The Iranian Maritime Code, 1964
3. IMO Resolution A.173 Participation in official inquiries into maritime casualties
4. IMO Resolution A.440/11 Exchange of information (in the case casualty investigation)
5. IMO Resolution A.637/16 Co-operation in maritime casualty investigation
6. IMO Model Course 3.11, Marine Accidents and Incidents Investigation

Part Three: Lectures (theory)

3.4. Topic Four: *Port State Control*

The nautical surveyor shall be capable of listing and identifying the mandatory certificates to be carried on board and should be familiar mainly with three sets of provisions as follows:

a. National legislation, codes and standards for the P.S.C.; and,

b. IMO guidelines for the P.S.C. mainly:
   i. IMO Resolution A. 466/12, Procedures for the control of ships(SOLAS and LOADLINE);
   ii. IMO Resolution 481/12, Principles of Safe Manning;
   iii. IMO Resolution A. 742/18, Procedures for the control of operational requirements related to the safety of ships and pollution prevention;
   iv. IMO Resolution A. 542/13, Procedures for the control of ships and discharges (MARPOL requirements);

c. The surveyor's manual on PSC.

3.4.1. Sub-topics:

1. General
   i. Guidelines to be observed during inspection of ships
   ii. Principles governing rectification of deficiencies of the ship
   iii. Application of the "No More Favourable Treatment Clause"
   iv. Detention of the Ships

2. Safety of the ships as related to SOLAS 74/88, MARPOL 73/78, Load Lines 66/88 and COLREG 72 Conventions.

3. Minimum Safe Manning standards and certification
   i. Introduction
   ii. Manning control
   iii. Certification control

4. Merchant Shipping Convention 1976 (ILO No. 147)

5. Non-Convention ships

3.4.2. Suggested Scheme[3]:

.1. Need for Control

- *.1.1. Provisions for port state control in IMO and ILO Conventions*
- *.1.2. Ships of non-parties*
- *.1.3. Ships below convention size*
- *.1.4. Identification of sub-standard ships or pollution risks*
- *.1.5. Regional control*
- *.1.6. Monitoring control*

.2. Main Elements of the Convention Requirements

- *.2.1. Status of conventions*
- *.2.2. SOLAS 1974*
- *.2.3. Load Line 1966*
- *.2.4. COLREG 1972*
- *.2.5. STCW 1978*
- *.2.6. MARPOL 73/78*
- *.2.7. ILO 147*

.3. Documentation

- *.3.1. Certificates and their supplements required under IMO conventions*
- *.3.2. Record Books*
- *.3.3. Manuals*

.4. Inspection of ships

- *.4.1. Inspection related to SOLAS certificates*
- *.4.2. Inspection related to the International LoadLine certificates*
- *.4.3. Inspection related to the IOPP certificates and oil record book*
- *.4.4. Inspection related to the Certificate of Fitness, NLS certificate and cargo record book*
- *.4.5. Inspection related to STCW 1978 documents*
- *.4.6. Inspection related to COLREG 1972*
- *.4.7. Inspection related to ILO conventions*
- *.4.8. Inspection of COW operations*

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[3] IMO Model Course 3.09, Port State Control

.4.9. *Inspection of unloading, stripping and pre-wash operations on chemical tankers*
.4.10. *Investigation of alleged discharge violations*
.4.11. *Exemptions*

.5. Action by the Port State
.5.1. *Deficiencies*
.5.2. *Violations of the discharge provisions*
.5.3. *Reports*

.6. Practical Port State Control Training
.6.1. *Organisation*
.6.2. *Aide-memoire for inspectors*
.6.3. *Safety*
.6.4. *Inspection practice*

During the training references should be made to:

1. Chapter seven of this paper

2. The International Convention for the Safety of Life at Sea, 1974, as amended,(SOLAS 74/78)

3. The International Convention for the Prevention of Pollution from Ships, 1973/78,(MARPOL 73/78)

4. The International Convention on Load Lines, 1966,(LL 66)

5. Convention on the International Regulations for Preventing Collisions at Sea, 1972,(COLREG 72)

6. IMO Model Course 3.09, Port State Control

7. Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk, (BCH Code)

8. International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk, (IBC Code)

9. International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk, (IGC Code)

10. IMO Resolution A. 466/12, Procedures for the control of ships(SOLAS and LOADLINE)

11. IMO Resolution 481/12 (Principle of Safe Manning).

12. IMO Resolution A. 542/13, Procedures for the control of ships and discharges (MARPOL requirements)

13. IMO Resolution A.742/18, procedures for the control of operational requirements related to the safety of ships and pollution prevention

14. IMO Resolution A.772/18, Fatigue factors in manning and safety

Part Three: Lectures (Theory)

3.5. Topic Five: *Work Environment*

Thorough introduction to the following sub-topics with consideration to national and international codes and requirements:

Sub-topics:

1. Health and Hygiene on board
2. Reports on personnel accidents
3. Safety on board ships
4. Maritime medicines
5. Prevention of accidents:
    i. Education and training
    ii. Regulations, codes and instructions
    iii. Maintenance
    iv. Control, survey and inspection
    v. Reliability
    vi. Responsibility and liability
6. Familiarisation with Code of Safety for Seafarers
7. Work environment committee
8. Noise reduction measures
    i. Maximum noise limit in the crew accommodation, control stations and engine room;
    ii. Familiarisation with Noise Survey Report.

During the training reference should be made to:

1. Chapter five, section 5.13. of this paper
2. The Iranian Maritime Code, 1964

3. IMO Resolution A.468/XII, Code on noise levels on board ship

4. ILO Convention 147, 1978, Merchant Shipping Minimum Standards

5. ILO Conventions 92, 1949 and 133,1970, Accommodation of Crew

6. ILO Recommendations 140 and 141, 1970, Air Conditioning and Noise Control

7. ILO Convention 109, 1958, Hours of work

8. ILO Convention 73, 1946 Medical examination

9. ILO Recommendations 105 & 106, 1958

10. ILO Convention 164,1987, Health Protection and Medical Care

Part Four: Technical Training

4.1. Topic One: *Life Saving Appliances*

Sub-Topic I: Documents

i. Plan approval
ii. Type approval of Life Saving Appliances
iii. Safety plans of the ship
iv. Muster List
v. Operating instructions, maintenance and Training Manuals

Sub-Topic II: Technical

Necessary knowledge to know the technical particulars and detailed survey and approval of:

Life boats:

Markings, launching equipment, runners, capacity, equipment inside, condition and length of ladder and certificate.

Life raft:

Number, position, HRU[4], launching, equipment and instruction, release system and Certificates.

Life jackets:

Number, location, lights, whistle, instruction manuals, Retro-reflective tape.

Life buoy:

Number, location, retro-reflective tape, attachments, as necessary and markings.

Man over board:

Release system, lowering, location, stability, recovering, equipment on board and instruction signs.

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[4]Hydrostatic Release Unit

Evacuation equipment:

i. Slide Escape Systems
ii. Instruction and signs for escape routes
iii. Access instruction, life raft arrangement accompanied
iv. Emergency lighting

Other safety Equipment:

i. Pyrotechnic and line throwing apparatus
ii. Breaches buoy
iii. Thermal Protective Aids
iv. Immersion Suits
v. Embarkation ladders
vi. Medical supplies

Musters and Drills:

i. Muster Station
ii. Muster list
iii. Life boat drills
iv. Evacuation drill

Training and Maintenance manuals

Part Four: Technical Training

4.1. Topic One: *Life Saving Appliances*

4.2. Suggested Scheme[5]:

4.2.1. Introduction

4.2.2. Preparation for surveys

4.2.3. Personal Life Saving Appliances

- *.1. Lifebuoys*
- *.2. Lifejackets*
- *.3. Immersion suits*
- *.4. Thermal Protective Aids*

4.2.4. Life boats and Rescue boats

- *.1. Life boats*
- *.2. Rescue boats*

4.2.5. Life rafts

- *.1. General provisions*
- *.2. Inflatable life rafts*
- *.3. Rigid life rafts*

4.2.6. Launching and embarkation arrangements

- *.1. Survival craft muster and embarkation arrangements*
- *.2. Life boat stowage and launching and embarkation appliances*
- *.3. Rescue boat stowage and launching and embarkation appliances*
- *.4. Liferaft stowage and launching and embarkation appliances*

4.2.7. Survival craft communications

- *.1. Portable radio apparatus*
- *.2. Radiotelegraph installation*

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[5] IMO Model Course 3.06, Survey of Life-Saving Appliances and Arrangements

.3. *Emergency Position-Indicating Radio Beacons*
.4. *Two-way radiotelephone apparatus*

4.2.8. Visual signals

.1. *Rocket parachute flares*
.2. *Hand flares*
.3. *Buoyant smoke signals*

4.2.9. Muster list, emergency instructions, manning of survival craft and maintenance

.1. *Muster lists*
.2. *Operating instructions*
.3. *Manning of survival craft*
.4. *Maintenance*

4.2.10. Line-throwing appliances, emergency lighting and general alarm system

.1. *Line-throwing appliances*
.2. *Emergency lighting*
.3. *General alarm system*

4.2.11. Testing and type approval of life-saving appliances

.1. *Testing of life-saving appliances*
.2. *Evaluation, testing and acceptance of prototype novel life-saving appliances*

4.2.12. Survey training

.1. *Initial surveys*
.2. *Periodical surveys*
.3. *Mandatory annual surveys*
.4. *Intermediate surveys of tankers of 10 years of age and over*

4.2.13. Review and final assessment

During the training reference should be made to:

A. Of this paper: Chapters two and three, sections; 3.2.1., 3.2.3., 3.2.4.

B. IMO Resolutions:

1. A.333/13, 693/17 & 761/18 "Recommendation on the conditions for the approval of servicing stations for inflatable life rafts"

2. A.520/13, Code of practice for the evaluation, testing and acceptance of prototype novel life-saving appliances and arrangements

3. A.522/13, Recommendation on carriage of Emergency Position Indicating Radio Beacons (E.P.I.R.B.)

4. A.560/14, Guidelines on surveys required by the 1978 SOLAS Protocol, the International bulk Chemical Code and the International Gas Carrier Code

5. A.603/15, Symbols related to life-saving appliances and arrangements

6. A.624/15, Guidelines on training for the purpose of launching lifeboats and rescue boats from ships making headway through the water

7. A.656/16, Guidelines for fast rescue boats

8. A.658/16, Use and fitting of retro-reflective materials on life-saving appliances

9. A.689/17, Recommendation on testing and evaluation of life-saving appliances

10. A.690/17, Periodical inspections of abandon ship and fire drills on passenger ships

11. A.691/17, Safety instructions to passengers

12. A.692/17, Guidelines and specifications for hyperbolic evacuation systems

Part four: Technical Training

4.2. Topic Two: *Fire Safety Measures*

Sub-topics:

.1. Fire detection Systems
.2. Control and safety plans
.3. Damage control plan
.4. Fire patrol plan and Watchman
.5. Structural fire safety
.6. General alarm and fire alarm
.7. Fire doors and fire dampers
.8. Fire station and fire muster list
.9. Fire man's outfits
.10. Fixed Fire extinguishing systems
  .i. Fire main, Fire hoses and nozzles
  .ii. Gas extinguishing systems (CO2, etc.)
  .iii. Drencher systems (dry pipe sprinkler)
  .iv. Automatic sprinkler system (wet pipe sprinkler)
  .v. High expansion foam system
  .vi. Low expansion foam system
  .vii. Dry powder fire--fighting system

.11. Portable extinguishers
.12. International Shore Connection
.13. Means to shut off the fuel supply
.13. Test methods for marine construction materials
.14. Fire Drills and drills Record Book
.15. Training Manuals

Survey training

.1. Initial survey
.2. Periodical survey
.3. Mandatory annual survey
.4. Intermediate survey

During the training reference should be made to:

1. Chapter three of this paper

2. SOLAS Convention 74/78 as amended

3. IMO Model Course 3.5, Survey of Fire Appliances and Provisions

IMO Resolutions:

1. A.123/5, Recommendation on Fixed Fire Extinguishing Systems for special category Spaces

2. A. 466/12, Procedures for the Control of the Ships

3. A. 470/12, International Shore Connection (shore side)

4. A. 471/12, Recommendation on Test Method for Determining the Resistance to Flame of Vertically Supported Textiles and Films

5. A. 472/12, Improved Recommendation on Test Method for qualifying marine construction materials as non-combustibles

6. A. 517/13, Recommendation on Fire Test Procedures for "A", "B" and "F" class divisions

7. A. 560/14, Guidelines on Surveys required by the 1978 SOLAS Protocol, the International Bulk Chemical Code and the International Gas Carrier Code

8. A. 563/14, Amendments to the Recommendation on Test Methods for the Determining the Resistance to Flame of Vertically Supported Textiles and Films

9. A. 565/14, Recommended Procedures to Prevent the Illegal or Accidental use of low Flash point cargo as fuel

10. A. 566/14, Draft amendments to regulation II-2/55-5 of SOLAS 1974/78 as amended

11. A. 597/15, Amendments to the Resolution A. 466/12 Procedures for the Control of Ships

12. A. 602/15, Revised Guidelines for Marine Portable Fire Extinguishers

13. A. 652/16, Recommendation on Fire Test Procedures for Upholstered Furniture

14. A. 653/16, Recommendation on Improved Fire Test Procedures for Surface Flammability of Bulkhead, ceiling and deck finish materials

15. A. 654/16, Graphic Symbols for Fire Control Plans

16. A.756/18, Guidelines on the information to be provided with fire control plans and booklets required by SOLAS regulations II-2/20 and 41-2

Part Four: Technical Training

4.3. Topic Three: *Navigation Equipment*

Suggested Scheme[6]:

4.3.1. Navigational Aids and Equipment

- *.1. General*
- *.2. Lights, shapes and sound signalling appliances.*
- *.3. Magnetic compasses*
- *.4. Gyro compasses*
- *.5. Automatic pilots*
- *.6. Radar, ARPA and ancillary equipment*
- *.7. Echo-sounding equipment*
- *.8. Speed and distance indicating devices*
- *.9. Rate-of-turn indicators*
- *.10 Miscellaneous bridge indicators*
- *.11. Pilot ladders and mechanical hoists*
- *.12. Aldis and signalling light*
- *.13. Nautical publication*
- *.14. Other navigation Aids and equipment*

3.3.2. Testing and Type Approval of Navigational Equipment

- *.1. Type approval*
- *.2. General performance standards*
- *.3. Specific performance standards*

3.3.3. Practical Training (on the job training)

- *.1. Initial surveys*
- *.2. Periodical surveys*
- *.3. Mandatory annual surveys*

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[6]2. IMO Model Course 3.08, Survey of Navigational aids and Equipment.

During the training reference should be made to:

1. Chapters two and three of this paper
2. SOLAS 74/78 Convention as amended
3. IMO Model Course 3.08, Survey of Navigational aids and Equipment
4. International Conference on Revision of the International Regulations for Preventing Collisions at Sea, 1972, as amended
5. Performance Standards for Navigational radar Equipment installed before 1.9.1984
6. Guidelines on Surveys required by the 1978 SOLAS Protocol, the International Bulk Chemical Code and The International Gas Carrier Code
7. IMO Resolution A. 575/14, Unification on Performance Standards for Navigational Equipment

Part Four: Technical Training

4.4. Topic Four: *Radio Communication*

4.4.1. Sub-topics:

.4.1.1. Radio installation

.4.1.2. Radio equipment according to sea areas (A1,2,3,4)

.4.1.3. Watches and Radio Records

.4.1.4. Independent sources of power supply

.4.1.5. Performance and Maintenance requirements

.4.1.6. Life Boat Radio

.4.1.7. Two-way Radiotelephone equipment

.4.1.8. Emergency Position Indicating Radio Beacon (E.P.I.R.B.)

During the training reference should be made to:

1. Chapter three of this paper
2. International Convention for the Safety of Life at Sea, 1974, as amended
3. A. 421/11, Operational Standards for Radio-telephone alarm signal generators
4. A. 605/15, Performance standards for survival craft portable two-way VHF Radio-telephone apparatus
5. A. 614/15, Carriage of Radar Operating the 9300-9500 MHz
6. A. 616/15, Search and rescue Homing capability

7. A. 617/15, Implementation of the NAVTEX System as a component of the world-wide navigational warning system

8. A. 663/16, and 698/17 Performance standards for INMARSAT Standard-C or Standard-A respectively, ship-earth stations capable of transmitting and receiving direct-printing communications or two-way communications

9. A. 701/17, Carriage of INMARSAT Enhanced group call SAFETY NET receivers on the GMDSS

10. A. 702/17, Radio maintenance guidelines for the GMDSS related to sea areas A3 and A4

11. A. 703/17, training of Radio personnel in the GMDSS

12. A. 704/17, Provisions of Radio Services fro the Global Maritime Distress and Safety Systems (GMDSS)

13. A. 705/17, Recommendation on Promulgation of maritime safety information

Part Four: Technical Training

4.5. Topic Five: *Tanker Vessels*

Sub-topics I: Tanker (General)

1. I.O.P.P. Certificate
2. Tanks arrangements
3. Pumping and piping arrangements
4. General precaution and hazards
    i. Electrostatic hazards
    ii. Fire and explosion hazards
5. Enclosed spaces (entry precautions and gas freeing)
6. Contingency plan:
    i. in the case of oil spill
    ii. in the cases of fire and explosion.
7. Atmosphere measuring devices:
    i. Explosimeter;
    ii. Oxygen content Meter;
    iii. Chemical Absorption Detectors.
8. Fire Fighting Equipment:
    i. Steam
    ii. Foam
    iii. Inert gas
9. Crude Oil Washing (COW)
10. Inert Gas System (IG)
11. Clean Ballast tanks (CBT) and Segregated Ballast Tanks (SBT)
12. Sludge and Slop tanks.
13. Oil discharge monitoring and control systems
14. Oily water separating and filtering systems
15. Oil Record Books:
    i. Part I, Engine Room operation;
    ii. Part II, Cargo operation.
16. Oil-confine equipment and barriers
17. Pressure/vacuum valves and mast raisers
18. Cargo heating systems
19. Discharge provisions
20. Retention of oil on board and shore reception facility

Sub-topics II: Tankers carrying Chemical and Liquefied Gas

In addition to the items mentioned above the following sub-topics are recommended with regard to special characteristics of the tankers carrying Chemical and Liquefied gas:

1. Introduction to Chemical and Liquefied Gas Tankers
2. Ship arrangements and cargo containment
3. Cargo tank vent systems
4. Divisions of tanks and categorisation/segregation of cargo
5. Ship survival capability and location of cargo tanks
6. Electrical installations
7. Mechanical ventilation in the cargo area
8. Pump rooms and other enclosed spaces
9. Procedures and Arrangements Manual (P&A Manual)
10. Associated risks and hazards of chemical and gas
11. Personal protective equipment

4.5.3. Practical training (on the job training)

During the training references should be made to:

1. Chapters four and five of this paper
2. International Convention for the Prevention of Pollution from Ships, 1973 as amended

3. International Convention For the Safety of Life at Sea, 1974, as amended

4. Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (BCH Code)

5. International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code)

6. International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code)

7. IMO Model Course 1.02, Advanced Training Programme on Oil Tankers operations

8. IMO Model Course 1.04, Advanced Training Programme on Chemical tankers

9. IMO Model Course 1.06, Advanced Training on Liquefied Gas Tanker Operation

10. IMO Resolution A.743/18, Oil tanker safety and marine environmental protection

11. IMO Resolution A.744/18, Guidelines on the enhanced programme of inspections during surveys of bulk carriers and oil tankers

Part Four: Technical Training

4.6. Topic Six: *Fishing Vessels*

Sub-topics:

1. Stability of fishing vessels
2. Seaworthiness
3. Deck mounted fishing gears and fishing methods
4. Life Saving Appliances
5. Fire protection, detection and extinction measures
6. Muster stations and boat/fire drills
7. Navigational equipment
8. Radio installation
9. Water and icing on deck
10. Subdivision and flooding of fish holds
11. Deck openings, bulwarks and guards
12. Certification:
    i. Fishing Vessel Safety Certificate
    ii. Fishing Permit

During the training reference should be made to:

1. Torremolinos International Convention for the safety of fishing vessels[7], 1977, and its Protocol of 1993

2. Guidelines for the design, construction and equipment of small fishing vessels

3. International convention for Safety of Life at Sea,1974 as amended

4. Code of Safety for Fisherman and Fishing Vessels

5. Voluntary guidelines for the Design, Construction and Equipment of Small Fishing Vessels

[7]The Convention is not yet in force

Part Four: Technical Training

4.7. Topic Seven: *Passenger Ships*

Sub-topic I: Certificates

1. Passenger Ship Safety Certificate
2. STP [8] and Space STP Certificates

Sub-topic II: Safety

1. Life Saving appliances:
    i. Life boats
    ii. Life rafts
    iii. Life jackets
    iv. Buoyant apparatus
    v. Rescue boat
2. Fire safety measures for passenger ships:
    i. fire zones (vertical and horizontal division)
    ii. fire safety measures for passenger spaces
    iii. fire and Safety patrol
3. Communication:
    i. between Control Stations and Crew
    ii. between Control Stations and passengers
4. Special stability criteria of passenger ships
5. Carriage of Dangerous Goods
6. Protection of special category spaces

Sub-topic III:

1. Health and Hygiene
2. Space requirements
3. Operational requirements

Sub-topic IV:

1. Initial survey
2. Annual survey
3. Periodical (renewal) survey
4. Additional survey

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[8] Special Trade Passenger ship

During the training reference should be made to:

1. Chapters three and five of this paper

2. International Convention for the Safety of Life at Sea, 1974/78 as amended

3. IMO Resolution A. 534/13 Code of Safety for Special Purpose Ships

4. International Conference on Special Trade Passenger Ships, 1971, (STP Convention)

5. International Conference on Space Requirements for Special Trade Passenger ships, 1973 (STP Space Convention)

Part Four: Technical Training

4.8. Topic Eight: *Cargo Ro-Ro Ships*

Sub-topics:

1. Familiarisation with Ro-Ro ships
2. Signs and instructions
3. Ramps and water tight cargo doors, (with special attention to the causes of recent Ro-Ro ships casualties)
4. Drainage of car decks
5. Hanging decks and ramps
6. Special stability criteria of Ro-Ro Ships
7. Ventilation requirements in car decks
8. Fire safety measures in car decks
9. Fire patrol
10. Audio-Visual alarm and Video Monitoring Systems for water tight ramps

Part Four: Technical Training

4.9. Topic Nine: *Safety of other ships*

Sub-topics:

1. Dynamically Supported Craft
2. Special Purpose Ships
3. Nuclear Ship
4. Offshore Supply Vessels
5. Offshore Installations (MODUs and Fixed platforms)

During the training references should be made to:

1. Chapters two, three, four and five of this paper
2. International Convention for Safety of Life at Sea 1974, as amended
3. IMO Resolution A.373/10, Code of Safety for Dynamically Supported Craft
4. Code for Safety Nuclear Merchant Ships
5. Safety recommendations on the use of ports by Nuclear Merchant Ships
6. Res. A. 649/16, Code for the Construction and Equipment of Mobile Offshore Drilling Units, 1989, (MODU 1989)
7. IMO resolution A.469/12, Guidelines for the Design and Construction of Offshore Supply Vessels

Part Four: Technical Training

4.10. Topic Ten: Transport of Special Cargo

Sub-topics I: *Transport of Bulk Cargo*

1. Accidental shifting of grain cargo
2. Adverse effect of shifting of cargo on stability (GM)
3. Heeling moments and related curves and tables
4. Free surface effect, free surface calculation, correction and its tables
5. Framing and scantling
6. Maximum ability of the vessel's construction to withstand stresses
7. Angle of Repose and trimming of cargo
8. Methods to secure the grain cargo
9. Cleanliness and hygiene of the cargo holds
10. Pesticide and insecticide
11. Fire and explosion hazards of grain dust
12. Liquefaction of solid bulk cargoes

Sub-topics II: *Transport of Timber Deck cargo*

1. Timber Load Line mark and relevant certificate
2. Special stability criteria
3. Stowage and securing
4. Adverse effect of water on deck cargo

Part Four: Technical Training

4.10. Topic Ten: Transport of Special Cargo

Sub-topics III: *Transport of Dangerous Cargo*

1. Proper and safe stowage of Dangerous goods
2. Incompatible goods
3. Explosives and detonators with serious risk
4. Mechanically ventilated space for Dangerous Goods in packaged form which give off dangerous vapours
5. Special precautions for carriage of flammable liquid or gases
6. Precautions for substances which are liable to spontaneous heating or combustion
7. Magazines
8. Additional requirements:
    i. Water supplies;
    ii. Source of ignition;
    iii. Fire detection system;
    iv. Ventilation and positive air draft;
    v. Bilge pumping arrangements;
    vi. Special requirement for personnel protection when handling Dangerous Goods ;
    vii. Portable fire extinguishers;
    viii. Insulation of machinery space boundaries;
    ix. Fixed water sprinkler system.

During the training reference should be made to:

1. Chapter three, four and five of this paper
2. International Convention for the Safety of Life at Sea, 1974/78 as amended
3. Code for Safe Practice of Solid Bulk Cargoes, (BC Code)
4. International Code for the Safe Carriage of grain in bulk, (International Grain Code)
5. Code for Safe Practice for Ships Carrying Timber Deck Cargoes, 1991
6. International Maritime Dangerous Goods Code
7. Medical First Aid Guide for Use in Accidents Involving Dangerous Goods

5. Part Five: Practical Training (On-the-Job-Training)

The field training on board of the various ships is the inseparable part, and most important phase of the training. One can claim that without practical application of the knowledge gained, the course can not reach its goals and objectives.

Sub-topics:

1. Visits and participation in activities in different Departments of the administration (as explained in 1.1.1)
2. Inclining Experiment of a ship
3. Stability calculation for use on board ship
4. Construction
    i. Main criteria
    ii. Detection of most common structural deficiencies (e.g. Cracks, corrosion)
5. Investigation, attending the case
6. Port State Control
7. Type approval and inspection of:
    i. Life Saving Appliance
    ii. Fire Fighting Equipment
8. Practical survey and inspection of navigation equipment
9. Practical survey of ships with particular attention to specific criteria of each category:
    i. Tanker vessel
    ii. Passenger ships
    iii. Fishing vessels
    iv. Ro-Ro ships
    v. Other ships
10. Observation of loading, discharging and transport of special cargoes:
    i. Dangerous cargo
    ii. Grain cargo
    iii. Timber cargo

During the training the reference should be made to:
Chapters two through eight of this paper and relevant national and international instruments as stated for each section.

CHAPTER NINE

Conclusion and Recommendation

In this paper, the author has attempted to initiate a procedure leading to a scheme for training of the nautical surveyors in I.R.Iran. The need for training of the surveyors, as control personnel, in the maritime administration is an evident fact. Obviously a nautical surveyor requires to muster wide range of knowledge and experience which mainly can be attained through a training course and on the job training. Taking advantage of his study in WMU and his professional experience, the author has proposed a scheme in chapter eight.

Furthermore he strongly recommends that the maritime administration (P.S.O.) takes the further necessary steps in order to establish a training course for the nautical surveyors. To achieve the above, and in order to provide required infrastructure and expertise, it is however recommended to co-operate with the following maritime bodies:

1. Various departments in the P.S.O. as mentioned in chapter eight;
2. Ministry of Culture and Higher Education and College of Nautical Studies, Chabahar;
3. Iranian Navy and Nowshahr Nautical College;
4. Classification Societies' representatives, recognised by P.S.O.;
5. International Maritime Organisation.

Finally, the author believes that the joint efforts of all the maritime parties in I.R.Iran and utilisation of all resources already available in the country, can assure the effectiveness and success of the training programme.

Annex

List of amendments and protocols to SOLAS CONVENTION

1914 CONVENTION: Never enter into force.
1929 CONVENTION: Entered into force 1933.
1948 CONVENTION: Entered into force 19.11.1952.

1960 IMO Convention

1974 CONVENTION: Entered into force 25.5.1980
1978 PROTOCOL: Entered into force 1.5.1981.
1981 AMENDMENT: Entered into force 1.9.1984
Res. MSC. 1 (Conv.)
Res. MSC. 2 (78 Prot.)
1983 AMENDMENT
Res. MSC. 6 (conv), Entered into force 1.7.1986.
Res. MSC. 4 (IBC-Code)
Res. MSC. 5 (IGC-Code)
1987 AMENDMENT
Res. MSC. 10/54 (IBC-Code), Entered into force 30.10.1988.
1988 PROTOCOL
Harmonised System of Surveys and Certification, Not yet in force
1988 AMENDMENT
Res. MSC. 11(April Ro-Ro), (result of the " HERALD OF FREE ENTERPRISE "), Entered into force 22.10.1989.
1988 AMENDMENT
Res. MSC. 12 (October Ro-Ro), Entered into force 29.4.1990.
1988 AMENDMENT
Convention and 1978 Protocol regarding GMDSS, Entered into force 1.2.1992.
1989 AMENDMENT
Res. MSC. 13 (April Amendment), Entered into force 1.2.1992.
1989 AMENDMENT
Res. MSC. 14 (IBC-Code), Entered into force 13.10.1990.
1990 AMENDMENT
Res. MSC. 19(Chapter II-1), (result of the "SCANDINAVIAN STAR")
Entered into force 1.2.1992.
1990 AMENDMENT, (Not yet in force - awaiting ratifications of 1988 Prot, to SOLAS 74 and LL 66
Res. MSC. 16 (IBC-Code) and Res. MSC. 17 (IGC-Code)
1991 AMENDMENT
Res. MSC. 22/59 (Incl. a new Grain-Code) expected to enter into force 1.1.1994.
Res. MSC. 23/59
1992 AMENDMENT
Resolution MSC. 24/60, Resolution MSC. 25/60 and Resolution MSC. 26/60 Not yet in force

THE HARMONISED SYSTEM OF SURVEY AND CERTIFICATION

YEAR	0	1	2	3	4	5
MONTHS	0	9 12 15	21 24 27	33 36 39	45 48 51	57 60
PASS. SHIP CERT.		Renewal	Renewal	Renewal	Renewal	Renewal
RADIO CERT.		Periodical	Periodical	Periodical	Periodical	Renewal
Safe. CONST. CERT.		Annual	Annual/ Intermediate	Annual/ Intermediate	Annual	Renewal
Safe. EQUIP. CERT.		Annual	Annual/ Periodical	Annual/ Periodical	Annual	Renewal

YEAR	0	1	2	3	4	5
MONTHS	0	9 12 15	21 24 27	33 36 39	45 48 51	57 60
LOAD LINE CERT.		Annual	Annual	Annual	Annual	Renewal
IGC		Annual	Annual/ Intermediate	Annual/ Intermediate	Annual	Renewal
IBC		Annual	Annual/ Intermediate	Annual/ Intermediate	Annual	Renewal

Source: IMO , MSC 58 / 11 / 1 , 13 December 1989

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